FILED

961642 APR 15 1997

No 96 OFFICE OF THE CLERK

IN THE

# Supreme Court of the United States

OCTOBER TERM, 1996

ALPEX COMPUTER CORPORATION,
*Petitioner,*

v.

NINTENDO COMPANY LTD. and NINTENDO OF AMERICA, INC.,
*Respondents.*

**On Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit**

## PETITION FOR A WRIT OF CERTIORARI

*Of counsel*:
ROBERT J. HOERNER
MARC L. SWARTZBAUGH
JONES, DAY, REAVIS & POGUE
North Point
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-3939

JOHN L. STRAUCH
(Counsel of Record)
BARRY L. SPRINGEL
RICHARD H. SAYLER
JOSEPH D. POLLACK
JONES, DAY, REAVIS & POGUE
North Point
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-3939

GREGORY G. KATSAS
JONES, DAY, REAVIS & POGUE
1450 G Street, N.W.
Washington, D.C. 20005
(202) 879-3939

*Counsel for Petitioner*

188 pp

## QUESTION PRESENTED

Under *Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*, 117 S. Ct. 1040 (1997), whether prosecution history estoppel applies to bar infringement of patent claims by equivalence, based on objections asserted by the patent examiner *only* against claims *different* from those in suit.

## PARTIES TO THE PROCEEDING

All parties to the proceedings below and here are listed in the caption. Petitioner Alpex Computer Corporation has no parent companies or partially owned subsidiaries. Petitioner notes that its affairs are currently administered by Leslie A. Patten of Denver, Colorado, a liquidating trustee appointed under a court-approved bankruptcy plan.

## TABLE OF CONTENTS


| | Page |
|---|---|
| QUESTION PRESENTED | i |
| PARTIES TO THE PROCEEDINGS | ii |
| TABLE OF AUTHORITIES | iv |
| OPINIONS BELOW | 1 |
| JURISDICTION | 1 |
| RELEVANT PROVISION | 1 |
| STATEMENT OF THE CASE | 1 |
| 1. The '555 Patent | 2 |
| 2. Prosecution History of the '555 Patent | 4 |
| 3. The NES | 7 |
| 4. The District Court Proceedings | 8 |
| 5. The Federal Circuit Decision | 13 |
| REASONS FOR GRANTING THE WRIT | 15 |
| CONCLUSION | 24 |

## TABLE OF AUTHORITIES

Page

Cases

*Biodex Corp. v. Loredan Biomedical, Inc.*, 946 F.2d 850 (Fed. Cir. 1991), *cert. denied*, 504 U.S. 980 (1992) . . . . . 21
*In re Bond*, 910 F.2d 831 (Fed. Cir. 1990) (per curiam) . . . 21
*D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570 (Fed. Cir. 1985) . . . . . 21
*Durango Associates, Inc. v. Reflange, Inc.*, 843 F.2d 1349 (Fed. Cir. 1988) . . . . . 21
*Graver Tank & Manufacturing Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950) . . . . . 17, 22
*Hartness International, Inc. v. Simplimatic Engineering Co.*, 819 F.2d 1100 (Fed. Cir. 1987) . . . . . 21
*Hilton Davis Chemical Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512 (Fed. Cir. 1995) (en banc) (per curiam), *rev'd*, 117 S. Ct. 1040 (1997) . . . . . 9, 22
*In re Hayes Microcomputer Products, Inc. Patent Litig.*, 982 F.2d 1527 (Fed. Cir. 1992) . . . . . 21
*Intel Corp. v. United States International Trade Comm'n*, 946 F.2d 821 (Fed. Cir. 1991) . . . . . 21
*King Instrument Corp. v. Otari Corp.*, 767 F.2d 853 (Fed. Cir. 1985), *cert. denied*, 475 U.S. 1016 (1986) . . 21
*Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533 (Fed. Cir. (1991) . . . . . 14
*Lawrence v. Chater*, 116 S. Ct. 604 (1996) (per curiam) . . . . . 20, 23
*Litton Industrial Products, Inc. v. Solid State Systems Corp.*, 755 F.2d 158 (Fed. Cir. 1985) . . . . . 23
*Mark I Marketing Corp. v. R.R. Donnelley & Sons Co.*, 66 F.3d 285 (Fed. Cir. 1995), *cert. denied*, 116 S. Ct. 917 (1996) . . . . . 9

## TABLE OF AUTHORITIES (Cont'd)

*Markman v. Westview Instruments*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 116 S. Ct. 1384 (1996) . . . . 8
*Markman v. Westview Instruments, Inc.*, 116 S. Ct. 1384 (1996) . . . . . 16, 20, 21
*Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931 (Fed. Cir. 1987) (en banc), *cert. denied*, 485 U.S. 961 (1988) . . . . . 8, 9, 14
*Raleigh v. Tandy Corp.*, No. C-95-2332-MHP, 1997 WL 26299 (N.D. Cal. Jan 10, 1997) . . . . . 21
*Symbol Technologies, Inc. v. Opticon, Inc.*, 935 F.2d 1569 (Fed. Cir. 1991) . . . . . 21, 22
*Texas Instruments v. United States International Trade Comm'n*, 988 F.2d 1165 (Fed. Cir. 1993) . . . . 9, 20
*Thomas v. American Home Products, Inc.*, 117 S. Ct. 282 (1996) . . . . . 20
*Valmont Industries Inc. v. Reinke Manufacturing Co.*, 983 F.2d 1039 (Fed. Cir. 1993) . . . . . 9
*Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*, 117 S. Ct. 1040 (1997) . . . . . *passim*

**Statutes**

28 U.S.C. § 1254(1) . . . . . 1
28 U.S.C. § 1331 . . . . . 8
28 U.S.C. § 1338(a) . . . . . 8
35 U.S.C. § 101 . . . . . 16
35 U.S.C. § 102 . . . . . 5, 16
35 U.S.C. § 103 . . . . . 16
35 U.S.C. § 112 . . . . . 16
35 U.S.C. § 112 ¶ 6 . . . . . *passim*
35 U.S.C. § 271 . . . . . 16
35 U.S.C. § 281 . . . . . 8
35 U.S.C. § 282 . . . . . 16, 19

## PETITION FOR A WRIT OF CERTIORARI

Alpex Computer Corporation respectfully petitions for a writ of certiorari to review the judgment of United States Court of Appeals for the Federal Circuit.

## OPINIONS BELOW

The opinion of the court of appeals (Pet. App. 1a) is reported at 102 F.3d 1214. The opinion of the district court (Pet. App. 17a) is reported at 34 U.S.P.Q.2d 1167 (BNA).

## JURISDICTION

The judgment of the court of appeals was entered on November 6, 1996. A timely petition for rehearing and suggestion for rehearing en banc was denied on January 15, 1997. This Court has jurisdiction under 28 U.S.C. § 1254(1).

## RELEVANT PROVISION

Paragraph 6 of 35 U.S.C. § 112 provides:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

## STATEMENT OF THE CASE

In this patent case, the Federal Circuit applied the doctrine of prosecution history estoppel to bar petitioner's assertions of infringement by equivalence, both under 35 U.S.C. § 112 ¶ 6 and under the doctrine of equivalents, based on a prior-art objection that was never asserted against the patent claims at issue. In so doing, that court relied solely upon prosecution statements made by petitioner about a claim substantially different from those in suit. After the Federal Circuit's decision, however, this Court held that prosecution history estoppel applies only where the specific claims in suit were narrowed during prosecution, in order to overcome prior-art or other patentability objections asserted against those claims. *Warner-Jenkinson Co., Inc. v. Hilton Davis*

*Chemical Co.*, 117 S. Ct. 1040, 1049-51 (1997). Because the Federal Circuit's estoppel holding is plainly untenable in light of *Warner-Jenkinson*, this Court should grant the petition for certiorari to reverse the judgment below or, at a minimum, to vacate the judgment and remand the case for reconsideration in light of *Warner-Jenkinson*.

**1. The '555 Patent**

Petitioner Alpex Computer Corporation owns United States Patent No. 4,026,555 ("the '555 patent"), which discloses an invention enabling users to control the video display of a standard television screen. Pat. Doc. 1a.[1] Claims 1 through 11 of the '555 patent claim a "[d]isplay control apparatus for use with a television receiver." Pat. Doc. 16a-17a. Claims 12 through 17 specifically claim an "[a]pparatus for playing games" on a television receiver. Pat. Doc. 17a. The patent specification confirms that the invention can be used either (i) as a "home intelligent terminal for generating or receiving, and displaying selected messages of any type" or (ii) as "an entertainment or game type device." Pat. Doc. 8a.

The only claims at issue in this case are claims 12 and 13 of the '555 patent, both of which are expressly limited to a video-game apparatus. By its terms, claim 12 is limited to a video-game apparatus consisting of four elements, including "means for generating a video signal" representing a "linear player image"

---

[1] The pertinent patent documents ("Pat. Doc.") have been reproduced in a separate appendix, as permitted by this Court's Rule 33.1(c).

and a "ball image." Pat. Doc. 17a.[2] Claim 13 is dependent upon claim 12 and incorporates all of its limitations. *Id.*[3]

By operation of 35 U.S.C. § 112 ¶ 6, the claimed "means for generating a video signal" covers (i) the "corresponding structure" for generating the signal, as described in the patent specification, and (ii) all "equivalents" of that "corresponding structure."[4] The "corresponding structure" includes a random

---

[2] In its entirety, claim 12 provides:

> Apparatus for playing games by displaying and manipulating player and ball image devices on the screen of a display tube, comprising
>
> [i] first means for generating a video signal representing a linear player image device aligned in a first direction,
>
> [ii] second means for generating a video signal representing a ball image device,
>
> [iii] manually operable game control means, and
>
> [iv] means responsive to said manually operable game control means for causing said first means to generate a video signal representing the player image device rotated so that it is aligned in a second direction different from said first direction.

Pat. Doc. 17a (indenting altered).

[3] Claim 13 provides:

> Apparatus according to claim 12, wherein said means for causing includes programmed microprocessor means and a replaceable memory having program game instructions stored therein for controlling said microprocessor means, whereby different games may be played with said apparatus by replacing said replaceable memory.

Pat. Doc. 17a.

[4] Paragraph 6 of 35 U.S.C. § 112 provides:

access memory, denoted in figure 2 of the patent specification as "RAM 32," for temporary storage of image data. Pat. Doc. 3a. The district court construed this "RAM 32" element as limited to a random access memory with "discrete storage positions which correspond to each of the bars or pixels of the TV screen." Pet. App. 26a-27a. Such a random access memory, referred to below as a "bit-mapped RAM," can selectively alter any one of the pixels that make up a standard television screen (under control of a microprocessor programmed to do so). Pet. App. 7a-8a.

**2. Prosecution History of the '555 Patent**

The pertinent prosecution history in this case involves a single objection asserted against application claim 1. The language of that claim, which was cancelled before the '555 patent ever issued, was substantially different from the language of claims 12 and 13 of the issued '555 patent, the only claims in suit and at issue. Application claim 1 claimed a "[d]isplay control apparatus for use with a television receiver," with no limitation to an "[a]pparatus for playing games," and with no limitation as to the types of images (such as a "linear player image" or "ball image") to be displayed on the screen. Pat. Doc. 62a.[5]

---

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Section 112 ¶ 6 thus allows a patentee to describe a claim element solely by reference to "the result accomplished or the function served." *See Warner-Jenkinson*, 117 S. Ct. at 1048. However, the statute limits such broad claim language to "only those means that are 'equivalent' to the actual means shown in the patent specification." *See id.*

[5] As originally drafted, application claim 1 of the '555 patent provided:

> Display control apparatus for use with a television receiver including video signal input terminals, a display tube, and means for scanning said display tube at a predetermined rate, comprising

During prosecution of the '555 patent, the patent examiner initially rejected application claim 1 on the ground that it was unpatentable under 35 U.S.C. § 102 (novelty and anticipation), in light of U.S. Patent No. 3,836,902 ("the Okuda patent"). Pat. Doc. 74a-76a. The Okuda patent claims a "graphic display system" consisting in pertinent part of a "memory means" comprised of "a number of closed loop shift registers." Pat. Doc. 24a.[6] Like application claim 1, and unlike claims 12 and

---

[i] memory means having a multiplicity of discrete storage positions, each of said storage position corresponding to a preselected image area of said display tube,

[ii] means for selectively writing digital data into selected ones of said storage positions, said storage positions being selected to correspond to a predetermined image to be displayed on said display tube,

[iii] means for sequentially reading stored data from said memory positions at said predetermined scanning rate, with each storage position being read essentially as the predetermined image area of the display tube corresponding to that storage position is being scanned, and

[iv] means responsive to said means for sequentially reading for generating a video signal adapted to be coupled to the video signal input terminals of a television receiver.

Pat. Doc. 62a.

[6] Claim 1 of the Okuda patent provides:

A graphic display system comprising

[i] a function generator means for generating coordinate components of line segments of a figure to be displayed in accordance with input information;

[ii] memory matrix means for storing a dotted pattern of said figure to be displayed in accordance with output signals from said function generator;

[iii] raster scanning means for scanning a cathode-ray tube; and

13 of the issued patent, the Okuda claims are not specifically limited to a video-game apparatus or to any particular form of display. The patent examiner did *not* cite Okuda against claims 12 and 13 of the '555 patent, against any claims expressly limited to an "[a]pparatus for playing games," or against any claims with game-type limitations such as a "linear player image" or "ball image." Pat. Doc. 74a-76a.[7]

In response to the citation of Okuda, petitioner modified application claim 1 to require RAM 32 as its intermediate memory device. Pat. Doc. 78a. Petitioner then distinguished RAM 32 from Okuda-type shift registers, in part on the ground that RAM 32 could modify "any single point on the TV screen." Pat. Doc. 83a. After the patent examiner rejected the modified claim as obvious in light of two patents other than Okuda, Pat. Doc. 86a-88a, petitioner cancelled application claim 1. Pat. Doc. 89a.

The patent examiner asserted only a single objection against the video-game claims in the '555 patent. He alleged that these claims would have been obvious as a combination of the system, keyboard, and "rotating means" disclosed in three patents other

---

> [iv] a recirculating memory means for storing information shifted from said memory matrix means, said information shifted from said memory matrix means being circulated in synchronism with said raster scanning means; wherein said recirculating memory means is comprised of a number of closed loop shift registers, said number corresponding to the number of raster scans of said cathode-ray tube carried out by said raster scanning means in one cycle of its operation.

Pat. Doc. 24a (indenting altered). All other claims in the Okuda patent are dependent upon this claim. Pat. Doc. 24a-25a.

[7] The patent examiner cited Okuda as an anticipation only against application claims 1, 2 and 4. Pat. Doc. 75a-76a. Application claims 2 and 4 were dependent on application claim 1 and contained no video-game limitations. Pat. Doc. 62a-63a. All of these claims were cancelled before the patent issued. Pat. Doc. 78a, 89a.

than Okuda. Pat. Doc. 75a-76a. Petitioner sought reconsideration on the ground that its video-game apparatus, by disclosing "the concept of rotating the players," constituted a patentable improvement over this prior art. Pat. Doc. 84a-85a. In order to "emphasize" this point (*id.*), petitioner slightly amended the fourth element of claim 12 (which was then application claim 14). As originally drafted, that claim had required a "player image device aligned in a second direction different from said first direction." Pat. Doc. 66a. Petitioner inserted language stressing that the "player image device" must be "*rotated* so that it is aligned in" the second direction. Pat. Doc. 80a (emphasis added). After that one minor change, which had nothing to do with the claimed "means for generating a video signal," the patent examiner allowed claim 12 without objection. Pat. Doc. 86a.[8]

### 3. The NES

Respondents Nintendo Company Ltd. and Nintendo of America, Inc. market the Nintendo Entertainment System ("NES"). Like the apparatus disclosed in claims 12 and 13 of the '555 patent, the NES specifically enables users to play video games. Pet. App. 2a. The NES also satisfies all of the other elements set forth in claims 12 and 13, including means for generating video signals representing (i) a "linear player image" aligned in a direction, (ii) a "ball image," and (iii) a player image "rotated so that it is aligned in a second direction." Court of Appeals Joint Appendix ("J.A.") 9133-34.

For temporary storage of picture data such as player and ball images, the NES uses eight shift registers, each of which can store eight individual "bits" of information. Pet. App. 5a. Under control of a microprocessor, the NES processes eight-bit

---

[8] The patent examiner asserted no objection to issued claim 13, which was not even inserted into the patent (as application claim 21) until after the examiner had cited Okuda against application claim 1. Pat. Doc. 92a. Application claims 14 and 21 were renumbered as claims 12 and 13 immediately before the patent issued. Pat. Doc. 99a.

"slices" of data from the shift registers to the television screen. *Id.* As this process is repeated, the NES assembles on the screen images of moving objects. *Id.*

**4. The District Court Proceedings**

In 1986, petitioner filed this patent infringement action against respondents in the United States District Court for the Southern District of New York.[9] Petitioner alleged that the NES infringed claims 12 and 13 of the '555 patent. As noted above, the district court construed these claims as requiring a bit-mapped RAM with "discrete storage positions which correspond to each of the bars or pixels of the TV screen." Pet. App. 26a-27a.[10]

Petitioner argued that the NES infringed claims 12 and 13 of the '555 patent both as an "equivalen[t]" within the meaning of § 112 ¶ 6 and as an equivalent under the doctrine of equivalents. Under the former theory, an accused device must perform the identical "function" claimed under § 112 ¶ 6 and, in so doing, must use a "structure" that is identical *or equivalent* to the "corresponding structure" disclosed in the patent specification. *See, e.g., Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987) (en banc), *cert. denied*, 485 U.S. 961 (1988). Under the latter theory, an accused device must contain elements equivalent to each element of the claim at issue. *See, e.g., Warner-Jenkinson*, 117 S. Ct. at 1049. Under either theory, the factual question of equivalence turns on whether the relevant

---

[9] Petitioner's claims arose under 35 U.S.C. § 281, and the district court had original jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

[10] This claim construction was proposed by a special master. Pet. App. 24a. Applying Federal Circuit law as it existed prior to *Markman v. Westview Instruments*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 116 S. Ct. 1384 (1996), the district court left construction of the "RAM" term to the jury, which adopted this construction in a special interrogatory. Pet. App. 25a. After the verdict, the district court (consistent with *Markman*) adopted the same construction as a matter of law. Pet. App. 26a-27a.

differences between the accused and the patented devices are at most "insubstantial." *See, e.g., Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1517-18 (Fed. Cir. 1995) (en banc) (per curiam) (doctrine of equivalents);[11] *Valmont Indus. Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1043 (Fed. Cir. 1993) (equivalence under § 112 ¶ 6).[12]

In the district court, respondents sought to bar petitioner, as a matter of law, from asserting that the NES shift registers were equivalent (even in the context of a video-game apparatus) to the bit-mapped RAM required under claims 12 and 13 as construed by the district court. Respondents invoked the doctrine of prosecution history estoppel, which operates as a "legal limitation" to bar otherwise permissible assertions of equivalence. *See Warner-Jenkinson*, 117 S. Ct. at 1049.[13] Respondents argued that because petitioner had distinguished RAM 32 from Okuda-type shift registers while prosecuting application claim 1,

---

[11] On direct review, this Court expressly declined to disturb that aspect of the Federal Circuit's en banc decision. *See Warner-Jenkinson*, 117 S. Ct. at 1053.

[12] The Federal Circuit repeatedly has stressed that § 112 ¶ 6 and the doctrine of equivalents provide alternative equivalence theories for establishing the infringement of claims drafted in means-plus-function format. *See, e.g., Pennwalt*, 833 F.2d at 933-36; *Valmont*, 983 F.2d at 1042-44. Because functional identity is required for purposes of infringement under § 112 ¶ 6, but not for purposes of infringement under the doctrine of equivalents, the latter theory is "somewhat broader." Pet. App. 37a.

[13] Even before *Warner-Jenkinson*, it was clear that the doctrine of prosecution history estoppel served to bar otherwise permissible assertions of equivalence. *See, e.g., Mark I Marketing Corp. v. R.R. Donnelley & Sons Co.*, 66 F.3d 285, 291 (Fed. Cir. 1995), *cert. denied*, 116 S. Ct. 917 (1996); *Texas Instruments v. United States Int'l Trade Comm'n*, 988 F.2d 1165, 1173-74 (Fed. Cir. 1993). Under these decisions, prosecution history estoppel, in contrast to equivalence and infringement, is a question of law for the court. *See, e.g., Mark I Marketing*, 66 F.3d at 291; *Texas Instruments*, 988 F.2d at 1173.

which was not in suit, petitioner could not assert equivalence between RAM 32 and the NES shift registers in order to prove infringement of claims 12 and 13. Pet. App. 154a-55a.

Respondents' prosecution history estoppel argument was repeatedly rejected. A special master concluded that there "cannot be an estoppel" because the Okuda patent "was never cited against claim 12." Pet. App. 155a. The special master further noted that claim 12, unlike either Okuda or application claim 1, was specifically directed to video games. *Id.*[14] The district court adopted the reasoning of the special master and concluded that prosecution history estoppel was inapplicable. Pet. App. 25a. In the end, even respondents themselves conceded that because Okuda had never been cited against claims 12 and 13 of the '555 patent, their prosecution history estoppel argument had been meritless. J.A. 14480 n.11 (post-trial briefing) ("Nintendo recognizes that Alpex's statements concerning Okuda do not create a file wrapper estoppel, because they were made with respect to a claim which is not asserted by Alpex.").[15]

At trial, petitioner presented substantial evidence of the equivalence between RAM 32 and the NES shift registers in the specific context of the video-game apparatus of claims 12 and 13.

---

[14] The special master explained that "Okuda does not mention video games, player images, ball images or rotation of such images, all of which are present in Claim 12" and that "claim 12 is a claim directed to an apparatus for playing games, not a video display apparatus as in claim 1." Pet. App. 155a-56a.

[15] Respondents did continue to assert that the prosecution history was relevant to interpreting the meaning of the claim terms and the "corresponding structure" disclosed in figure 2 of the specification. J.A. 14480-81. But as we explain below, *see infra* at 20-21, there is a fundamental difference between using prosecution history to determine the literal meaning of a term such as "RAM 32" (an aspect of claim construction) and using prosecution history to bar otherwise permissible assertions of equivalence involving the term (the distinctive function of estoppel).

Ronald Milner, a technical expert with substantial experience in designing video-game systems, explained in detail that there was no substantial difference between assembling an image by storing it in memory and then processing it to the screen (as with RAM 32) or assembling the image by storing and processing individual "slices" of it "over and over" (as with NES). Pet. App. 39a-42a. Addressing structure specifically, Mr. Milner demonstrated a one-to-one correspondence between the components disclosed in figure 2 of the specification, including RAM 32, and the components of the NES. Trial Transcript ("Tr.") 1893-98.[16] Milner repeatedly testified that these similarities, in the context of claims 12 and 13, established "structural" equivalence for purposes of § 112 ¶ 6 (*e.g.*, Tr. 1894, 1910, 2179)[17] as well as equivalence of function,

---

[16] In this testimony, Milner utilized both an actual NES console (Tr. 1897-98) and a block diagram of its structure (reprinted at Pet. App. 4a).

[17] Milner's repeated testimony about "structural" equivalence was clear and unequivocal (Tr. 1894, 1910, 2179):

> Q: Now, what, in your view, does a comparison of Figure 2 of the patent . . . and the block diagram of the Nintendo Entertainment System, show?
>
> A: They show that the Nintendo Entertainment System for purposes of Claim 12 is the substantial structural equivalent.
>
> * * * *
>
> Q: Is the Nintendo system the structural equivalent of the bit-mapping described in the preferred embodiment in the ['555] patent?
>
> A: Yes, it is.
>
> * * * *
>
> Q: Are the shift registers used in the Nintendo PPU the substantial structural equivalent of the display RAM in the ['555] patent for the functions that are required to be performed in Claim 12?

way *and* result for purposes of the doctrine of equivalents (*e.g.*, Tr. 1910-15).[18] Moreover, Wallace Kirschner, one of the inventors of the patented invention, testified that the intermediate memory devices described in the '555 patent and used in the NES are "basically interchangeable." Pet. App. 43a. Mr. Kirschner further testified that control of individual pixels was important not in the context of video games, but only in the context of "intelligent terminal" applications (Pat. Doc. 8a) such as a "personal computer" or "modem." Tr. 770, 973-75. Stephen Ward, a technical expert for respondents, confirmed that individual-pixel control was important only "for things like word

---

A: They are for those functions.

Q: And does the use of shift registers instead of a display RAM in Claim 12 add anything of significance to the invention?

A: No, it doesn't.

[18] Milner's testimony about equivalence under the doctrine of equivalents was equally clear and unequivocal. For example, addressing the claimed "means for generating a video signal," Milner testified (Tr. 1913):

Q: Directing your attention to the first means clause of Claim 12 . . . does the NES perform substantially the same function as stated in the first means clause?

A: Yes, it does.

Q: Does the NES perform that function in substantially the same way as required by the first means clause?

A: Yes, it does.

Q: Does the NES obtain substantially the same result as that required by the first means clause of Claim 12?

A: It does, and that's putting up a picture.

As required under *Warner-Jenkinson*, 117 S. Ct. at 1048-49, Milner separately assessed equivalence for each element of claims 12 and 13. *See* Tr. 1913-15.

processing," which require the "ability to portray a very flexible *static* image." Tr. 2600 (emphasis added).

After a four-week trial on liability, the jury concluded that respondents had infringed the '555 patent, both under § 112 ¶ 6 and under the doctrine of equivalents. Pet. App. 17a, 43a. After another two-week trial on damage-related issues, the jury further concluded that the infringement by respondent Nintendo of America had been willful. Pet. App. 100a-01a. The jury awarded damages of approximately $208,000,000, based on stipulated infringing sales of $3.4 billion and a six percent royalty rate. Pet. App. 102a-04a.

In a comprehensive 128-page opinion, the district court denied respondents' motion for judgment as a matter of law. After setting forth the legal definitions of equivalence under § 112 ¶ 6 and under the doctrine of equivalents (Pet. App. 35a-37a), the court concluded that there was sufficient evidence to support the verdict of equivalence and infringement under both theories. Pet. App. 38a-47a. The court carefully reviewed the evidence of equivalence, including Milner's testimony about how the devices operated (Pet. App. 40a-42a) and Kirschner's testimony that they were "basically interchangeable" (Pet. App. 43a). The court entered judgment for petitioner.[19]

**5. The Federal Circuit Decision**

The Federal Circuit reversed. Beginning with claim construction, that court agreed with the district court that claims 12 and 13 require a random access memory with "discrete storage positions which correspond to each of the bars or pixels on the TV screen." Pet. App. 11a. The court reasoned that petitioner

---

[19] The district court also addressed claim construction and infringement issues regarding the "linear player image" term of claim 12 and the read only memory ("ROM") component of figure 2. Pet. App. 27a-34a. The court also addressed validity issues (Pet. App. 50a-74a), new trial issues (Pet. App. 74a-83a), and damages issues (Pet. App. 83a-112a). None of those rulings is at issue here.

had so limited the "RAM 32" element by asserting, in distinguishing application claim 1 from Okuda, that RAM 32 was "capable of modifying a single bit, or pixel, on the television receiver." Pet. App. 10a. The court further concluded that the NES "cannot modify a single pixel." Pet. App. 11a. Thus, it held that the NES lacked the "RAM 32" element necessary to infringe the literal terms of claims 12 and 13. Pet. App. 9a-11a.

Turning next to the question of infringement by equivalence under § 112 ¶ 6, the court of appeals then invoked the Okuda prosecution history for purposes of estoppel. Instead of assessing the evidence supporting the jury's factual determination of equivalence, and giving it the required deference, the court held that "[f]or the reasons stated above," in its extended discussion of the Okuda prosecution history, "the NES *cannot infringe* claims 12 and 13 of the '555 patent *as equivalents* under § 112 ¶ 6, under a proper claim construction." Pet. App. 12a (emphases added). The court specifically invoked "prosecution history estoppel," which it said "act[s] to estop an equivalence argument." *Id.* The court repeatedly used terms such as "estopped" and "estoppel" to describe what it viewed as the dispositive legal significance of the prosecution history in foreclosing the § 112 ¶ 6 equivalence asserted by petitioner. Pet. App. 12a-13a.[20]

Under its legal holding that the NES "cannot infringe," the court had no occasion to consider, and did not seriously consider, the substantial evidence of equivalence under § 112 ¶ 6. Thus, the court did not even acknowledge, much less discuss, (i)

---

[20] The Federal Circuit has used the term "literal infringement" in the § 112 ¶ 6 context to describe (i) devices that use a "structure" *identical* to the "corresponding structure" disclosed in the specification and (ii) devices that use a "structure" *equivalent* to that "corresponding structure" (within the meaning of § 112 ¶ 6). *See, e.g., Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1535-36 (Fed. Cir. 1991); *Pennwalt*, 833 F.2d at 934. Literal infringement only in the second sense is at issue here.

Milner's testimony about one-to-one correspondence, (ii) Kirschner's testimony about interchangeability, or (iii) Kirschner's and Ward's testimony about the limited contexts in which individual-pixel control is important. And in asserting that Milner's other testimony did not adequately "compare the structure[s]" at issue, the court again referred back to the Okuda prosecution history, stating that "the bit map structure was clearly distinguished over a shift register structure during the prosecution of the '555 patent." Pet. App. 13a.

Moving from infringement by equivalence under § 112 ¶ 6 to infringement under the doctrine of equivalents, the court once again applied prosecution history estoppel. With no hint of deference to the jury's factual determination of equivalence, the court held that "using shift registers, instead of RAM, to process data for video display, is not merely an unimportant and insubstantial change." Pet. App. 16a. In explaining why, the court again referred repeatedly to what it viewed as the dispositive legal significance of the Okuda prosecution history. The court stated that "[a]s discussed above, Alpex described its claims during the prosecution of the '555 patent as covering random access systems capable of changing a single bit"; that petitioner thus "did not *and could not* claim image generation by shift registers"; and that the doctrine of equivalents "is not meant to cover systems that are clearly defined as outside the bounds of the claims." *Id.* (emphasis added). Given these legal rulings foreclosing the equivalence asserted by petitioner, the court "[a]ccordingly" concluded, not surprisingly, that there was insufficient evidence "to support a finding of infringement." *Id.*

## REASONS FOR GRANTING THE WRIT

Six weeks after the court of appeals denied rehearing in this case, this Court, in *Warner-Jenkinson*, established significant legal limitations on the doctrine of prosecution history estoppel. The decision below is plainly inconsistent with those limitations. Accordingly, this Court should grant the petition for certiorari to reverse the judgment below or, at a minimum, to vacate the

judgment and remand the case for reconsideration in light of *Warner-Jenkinson*.

1. In *Warner-Jenkinson*, this Court unanimously held that prosecution history estoppel applies only where the specific claims at issue were narrowed during prosecution, in order to overcome prior-art or other patentability objections asserted against those claims. 117 S. Ct. at 1049-51. In limiting prosecution history estoppel to the facts of its prior cases, the Court repeatedly stressed the narrow and claim-specific nature of that doctrine. For example, the Court made clear that prosecution history estoppel must be "tied to amendments made to avoid the prior art, or otherwise to address a specific concern — such as obviousness — that arguably would have rendered *the claimed subject matter* unpatentable." *Id.* at 1049 (emphasis added). Similarly, it indicated that prosecution history estoppel applies only where "a change was demanded because *the claim as otherwise written* was viewed as not describing a patentable invention at all." *Id.* at 1050 (emphasis added). Indeed, even where the very claim at issue has been modified, this Court held that if the modification occurred for reasons unrelated to the patentability of that claim, "the change may introduce a new element, but it does not necessarily preclude infringement by equivalents of that element." *Id.* at 1050-51. The Court thus rejected the contention that "any surrender of subject matter during prosecution history" gives rise to an estoppel. *Id.* at 1049.

*Warner-Jenkinson* thus harmonized the law of prosecution history estoppel (and equivalence) with the claim-specific focus of patent law generally. Strictly speaking, each distinct "invention" is potentially patentable (35 U.S.C. § 101), and each "claim" discloses a distinct "invention" (35 U.S.C. § 112). *See, e.g.*, *Warner-Jenkinson*, 117 S. Ct. at 1048-49; *Markman v. Westview Instruments, Inc.*, 116 S. Ct. 1384, 1387-88 (1996). Accordingly, the patent statute expressly requires a claim-specific approach to such basic determinations as novelty (35 U.S.C. § 102), obviousness (35 U.S.C. § 103), infringement (35 U.S.C. § 271), and validity (35 U.S.C. § 282). Moreover, this Court has long held that equivalence also must be assessed in a highly

contextual way. In *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605 (1950), the Court explained:

> What constitutes equivalency must be determined against the context of the patent, the prior art, and the particular circumstances of the case. Equivalence, in patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum. It does not require complete identity for every purpose and in every respect. . . . *[T]hings for most purposes different may sometimes be equivalents.* Consideration must be given to the purpose for which an ingredient is used in a patent, the qualities it has when combined with the other ingredients, and the function which it is intended to perform.

*Id.* at 609 (emphasis added). In *Warner-Jenkinson* itself, the Court further held that equivalence must be assessed not only on a claim-by-claim basis, but also on an element-by-element basis. *See* 117 S. Ct. at 1049.

2. The court of appeals' estoppel holding is clearly unsustainable in light of *Warner-Jenkinson*. As explained above, the court held that petitioner's distinction of its "RAM 32" from Okuda-type shift registers, with respect to application claim 1, barred any assertion of *equivalence* between RAM 32 and the NES shift registers *for purposes of claims 12 and 13* — even though the Okuda patent was never cited against those claims. Thus, the patent examiner never demanded amendments on the ground that claims 12 and 13 "as otherwise written" were unpatentable over Okuda. *Id.* at 1050. And petitioner never amended claims 12 and 13 "to address a specific concern" that "arguably would have rendered" those claims unpatentable. *Id.* at 1049. The patent examiner asserted only a single objection against claim 12 (and none against claim 13), and the objection had nothing to do either with Okuda or with the "RAM 32" element whose range of equivalence was at issue during this

litigation.[21] The prosecution history thus makes perfectly clear that if petitioner had submitted only claims 12 and 13 as originally drafted, the patent examiner would never have cited Okuda at all, and the patent would have issued without any relevant objection or modification. Under *Warner-Jenkinson*, prosecution history estoppel does not apply in these circumstances.[22]

This case provides a textbook justification for the narrow and claim-specific approach to prosecution history estoppel adopted by this Court in *Warner-Jenkinson*. For several reasons, the distinction at issue (ability to modify a single pixel), asserted by petitioner only in the context of the display control apparatus described in application claim 1, should not have dispositive significance in determining the range of equivalents of the video-game apparatus described in claims 12 and 13.

- The '555 patent, in disclosing the preferred embodiment for the video-game apparatus described in claims 12 and 13, sets forth a "linear player image" that occupies sixty-four bits of memory, and a "ball image" that occupies nine. Pat. Doc. 3a, 5a, 11a (col. 8, lines 52-56), 14a (col. 14, lines 64-68). Nothing in the patent suggests that the ability to modify a single pixel is significant in the specific context of a video-game apparatus.

- The trial testimony established that the ability to modify a single pixel was significant not in the specific context of a video-game apparatus, but only with respect to intelligent-terminal applications such as a personal computer, modem, or word-processor. Tr. 770, 973-75 (Kirschner); Tr. 2600 (Ward).

---

[21] As explained above, that objection was resolved by a clear statement that the required "player image device" must itself be "rotated." *See supra* at 6-7.

[22] Because the prosecution history of the '555 patent does not involve claim amendments made for unknown reasons, the presumption that such amendments relate to the patentability of the amended claim, *see Warner-Jenkinson*, 117 S. Ct. at 1051, has no bearing on this case.

• Even the prosecution history establishes that the distinctions between a bit-mapped RAM and Okuda-type shift registers are insubstantial in certain contexts. The patent examiner rejected application claims 3 and 13 on the ground that it would be "obvious," in the context of those claims, to substitute the RAM contained in a patent issued to James Candy, which is bit-mapped,[23] for the Okuda shift registers. Pat. Doc. 74a-76a. That conclusion, made by an examiner skilled in the art, indicates that similar substitutions could be obvious, and could create only "insubstantial" differences (*Warner-Jenkinson*, 117 S. Ct. at 1054), in other contexts as well.

• Respondents themselves, explicitly recognizing Okuda's irrelevance to claims 12 and 13 of the '555 patent, conceded in the district court that "Alpex's statements concerning Okuda do not create a file wrapper estoppel." J.A. 14480 n.11. Moreover, respondents never relied upon Okuda as a ground for having claims 12 and 13 declared invalid[24] — even though patentability objections give rise, by operation of 35 U.S.C. § 282(2), to validity defenses. Both the district court (Pet. App. 50a-74a) and the court of appeals (Pet. App. 16a) upheld the jury's conclusion that claims 12 and 13 were not invalid.

For all of these reasons, it is abundantly clear that the objection and amendments to application claim 1 should not — and under *Warner-Jenkinson* do not — create a legal bar to otherwise permissible assertions of infringement by equivalence made under claims 12 and 13. Because the Federal Circuit's application of prosecution history estoppel is clearly unsustainable in light of *Warner-Jenkinson*, this Court should grant the petition for certiorari and reverse that court's demonstrably erroneous judgment.

---

[23] *See* J.A. 14696, col. 2, lines 52-56; J.A. 14697, col. 3, lines 50-54.

[24] *See, e.g.*, Appellants' Opening Brief at 34-39, *Alpex Computer Corp. v. Nintendo Co., Ltd.*, No. 95-1911 (Fed. Cir. filed April 20, 1995).

3. At a minimum, this Court should grant the petition for certiorari, vacate the judgment below, and remand the case ("GVR") for reconsideration in light of *Warner-Jenkinson*. A GVR is appropriate if, in light of an intervening decision from this Court, there is a "reasonable probability" that the lower court would reconsider its holding, and if that reconsideration "may determine the ultimate outcome of the litigation." *Lawrence v. Chater*, 116 S. Ct. 604, 607 (1996) (per curiam). The GVR standard is a "liberal" one. *See id.* To warrant GVR, a case need not satisfy the criteria that govern grants of certiorari for plenary review on the merits. *See Thomas v. American Home Prods., Inc.*, 117 S. Ct. 282, 283 (1996) (Scalia, J., concurring).

The modest standards for GVR are easily satisfied here. As explained above, there is at least a "reasonable probability" that the court of appeals would reconsider its misapplication of prosecution history estoppel in light of *Warner-Jenkinson*. And as we now explain, such reconsideration certainly "may" — and indeed probably will — be dispositive.

a. In addressing equivalence under § 112 ¶ 6, the court of appeals at times blurred the distinction between claim construction and prosecution history estoppel.[25] Claim construction involves determining the literal meaning of actual claim terms (including specification terms that constitute the "corresponding structure" under § 112 ¶ 6). *See Markman*, 116 S. Ct. at 1387. In contrast, prosecution history estoppel bars assertions of equivalence with respect to accused devices that, by definition, fall outside the literal scope of the claims. *See Warner-Jenkinson*, 117 S. Ct. at 1049-51; *Texas Instruments v. United States Int'l Trade Comm'n*, 988 F.2d 1165, 1173 (Fed. Cir. 1993) (estoppel operates as "limitation to the range of equivalents available to the patentee"). Accordingly, the Federal Circuit's holding that the NES "*cannot infringe* claims 12 and 13 of the '555 patent *as*

---

[25] *E.g.*, Pet. App. 13a (prosecution history "'may work an *estoppel* against a subsequent different or broader *interpretation*'" (emphases added and citation omitted)).

*equivalents*," Pet. App. 12a (emphases added), can be understood only in estoppel terms. Thus, one district court already has read the opinion below as holding that "'prosecution history estoppel' applies to the determination of structural equivalents in a means-plus-function case." *Raleigh v. Tandy Corp.*, No. C-95-2332-MHP, 1997 WL 26299, *2 (N.D. Cal. Jan 10, 1997). The official reports likewise announce, as the principal holding of the decision below, that both of petitioner's assertions of equivalence were "barred by prosecution history estoppel." *Alpex Computer Corp. v. Nintendo Co. Ltd.*, 102 F.3d 1214, 1214 (Fed. Cir. 1996) (syllabus).[26]

To reach the same result without estoppel, the court of appeals would have to embrace the proposition that determinations of structural *equivalence* under § 112 ¶ 6 are an aspect of claim construction, so that the § 112 ¶ 6 equivalence asserted by petitioner could be regarded as raising a question of law, *see Markman*, 116 S. Ct. at 1387, without any need for deference to the jury verdict. To treat equivalence under § 112 ¶ 6 as a question of law, however, would require the Federal Circuit to overrule a long line of its prior holdings that § 112 ¶ 6 equivalence "is a factual determination." *Symbol Technologies, Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1575 (Fed. Cir. 1991).[27]

---

[26] Of course, the Federal Circuit did construe the literal meaning of the "RAM 32" term in reaching its decision. As explained above, however, that construction by itself cannot support the holding at issue here — that the NES "cannot infringe . . . as equivalents." Pet. App. 12a.

[27] *See, e.g., In re Hayes Microcomputer Prods., Inc. Patent Litig.*, 982 F.2d 1527, 1541 (Fed. Cir. 1992); *Biodex Corp. v. Loredan Biomedical, Inc.*, 946 F.2d 850, 852-53 (Fed. Cir. 1991), *cert. denied*, 504 U.S. 980 (1992); *Intel Corp. v. United States Int'l Trade Comm'n*, 946 F.2d 821, 841 (Fed. Cir. 1991); *In re Bond*, 910 F.2d 831, 833 (Fed. Cir. 1990) (per curiam); *Durango Assoc., Inc. v. Reflange, Inc.*, 843 F.2d 1349, 1357 (Fed. Cir. 1988); *Hartness Int'l, Inc. v. Simplimatic Engineering Co.*, 819 F.2d 1100, 1110 (Fed. Cir. 1987); *King Instrument Corp. v. Otari Corp.*, 767 F.2d 853, 862 (Fed. Cir. 1985), *cert. denied*, 475 U.S. 1016 (1986); *D.M.I., Inc. v. Deere & Co.*, 755

Moreover, the theory that § 112 ¶ 6 equivalence is a question of law could not possibly salvage the Federal Circuit's judgment with respect to the doctrine of equivalents, because this Court has long held that equivalence in that context "is a determination of fact." *Graver Tank*, 339 U.S. at 609-10.[28]

b. Nor could the Federal Circuit sustain its judgment on the ground that, even apart from the improperly applied estoppel, there is insufficient evidence of equivalence and infringement. The expert testimony of Mr. Milner, who concluded that the NES infringed claims 12 and 13 as an equivalent both under § 112 ¶ 6 (*e.g.*, Tr. 1894, 1910, 2179) and under the doctrine of equivalents (*e.g.*, Tr. 1910-15), is itself sufficient to create a genuine factual dispute under the Federal Circuit's decision in *Symbol Technologies*, which upheld a finding of equivalence under § 112 ¶ 6 based solely on the "ultimate issue" testimony of a qualified expert. *See* 935 F.2d at 1574-76. Milner presented far more than "ultimate issue" testimony, explaining in detail the pertinent similarities between the NES and the video-game apparatus disclosed in claims 12 and 13 (Pet. App. 39a-42a), including structural similarities such as the one-to-one correspondence between the respective components of each device (Tr. 1893-98). Moreover, Mr. Kirschner testified that the respective memory devices are "basically interchangeable" (Pet. App. 43a) — a consideration long held "'important'" to equivalence analysis, *see Warner-Jenkinson*, 117 S. Ct. at 1047 (quoting *Graver Tank*, 339 U.S. at 609). Finally, to the extent that petitioner's distinction of Okuda had any evidentiary significance with respect to equivalence, the patent itself (Pat.

---

F.2d 1570, 1575 (Fed. Cir. 1985).

[28] In *Warner-Jenkinson* itself, although the Federal Circuit vigorously debated whether equivalence was a matter for judges or juries, every member of the *en banc* court recognized the settled rule that equivalence under the doctrine of equivalents is a question of fact. *See* 62 F.3d at 1520; *id.* at 1543 (Plager, J., dissenting); *id.* at 1550 (Nies, J., dissenting).

Doc. 11a, 14a), Kirschner's testimony (Tr. 770, 973-75), and Ward's testimony (Tr. 2600) all indicate that this distinction was not important in the specific context of a video-game apparatus.

Although this evidence is clearly sufficient to support factual findings of infringement and equivalence, it is worth noting that any uncertainty on this point must doubly be resolved in petitioner's favor. First, in making its sufficiency determinations on remand, the court of appeals would be obliged to "resolve all doubt" in favor of the verdict. *See Litton Indus. Prods., Inc. v. Solid State Systems Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985). And second, in predicting how the court of appeals would make those determinations on remand, this Court should resolve any of its doubts in favor of a GVR. *See Lawrence*, 116 S. Ct. at 607.

In sum, the possibility that the Federal Circuit on remand would reach the same result on different grounds is at best remote. Accordingly, this Court should not leave undisturbed an estoppel holding that is plainly unsustainable in light of its intervening decision in *Warner-Jenkinson*.

## CONCLUSION

The petition for a writ of certiorari should be granted.

Respectfully submitted,

*Of counsel*:

ROBERT J. HOERNER
MARC L. SWARTZBAUGH
JONES, DAY, REAVIS & POGUE
North Point
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-3939

JOHN L. STRAUCH
(Counsel of Record)
BARRY L. SPRINGEL
RICHARD H. SAYLER
JOSEPH D. POLLACK
JONES, DAY, REAVIS & POGUE
North Point
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-3939

GREGORY G. KATSAS
JONES, DAY, REAVIS & POGUE
1450 G Street, N.W.
Washington, D.C. 20005
(202) 879-3939

*Counsel for Petitioner*

Dated: April 15, 1997

# APPENDIX

**UNITED STATES COURT OF APPEALS,
FOR THE FEDERAL CIRCUIT**

**ALPEX COMPUTER CORPORATION,
Plaintiff/Cross-Appellant,**

**v.**

**NINTENDO COMPANY LTD. and
Nintendo of America, Inc.,
Defendants-Appellants.**

**Nos. 95-1191, 95-1229.**

Nov. 6, 1996.

Before ARCHER, Chief Judge, RICH, and NEWMAN, Circuit Judges.

ARCHER, Chief Judge.

Nintendo Company, Ltd. and Nintendo of America, Inc. (collectively Nintendo) appeal the January 6, 1995, judgment of the United States District Court for the Southern District of New York, *Alpex Computer Corp. v. Nintendo Co.*, 34 USPQ2d 1167 (S.D.N.Y.1994), holding U.S. Patent No. 4,026,555 (the '555 patent), owned by Alpex Computer Corporation (Alpex), not invalid, willfully infringed, and awarding $253,641,445 in damages and interest. We affirm the judgment as to validity and reverse the judgment of infringement.

I.

This case deals with an invention within the art of video games. The video game industry began in the early 1970s and includes two branches, arcade video games and home video games. Arcade video games are large, expensive, coin-operated machines that are placed in high traffic areas such as amusement arcades. These machines are generally referred to as "dedicated" because they can play only one game. Home video games, in contrast, are small, relatively inexpensive devices that are easily connected to the antennae terminals of a standard television. The

Magnavox Odyssey was the first home video game. It too was a dedicated system playing only one game which was referred to as the "ball and paddle" because a dot of light bounced between two player-controlled vertical lines.

In early 1974, the inventors of the patent in suit conceived of a new microprocessor-based home video game system that used modular plug-in units—replaceable, read-only memory, or ROM, cartridges—to permit home video systems to play multiple games, including games with rotating images. The '555 patent on this invention issued to Alpex on May 31, 1977. The patented invention was commercialized in systems by Atari, Mattel, and Coleco.

In the early 1980s, Nintendo entered the home video game market with the Nintendo Entertainment System (NES). After the NES was featured at the 1985 Consumer Electronics Show, Alpex notified Nintendo of possible infringement of the '555 patent. Soon thereafter, in February 1986, Alpex filed suit against Nintendo for patent infringement. Over the next several years, Alpex and Nintendo conducted various pre-trial proceedings. During these proceedings, Nintendo requested certification of certain issues to this court for interlocutory appeal, which the district court granted. However, this court denied leave to appeal. *Alpex Computer Corp. v. Nintendo of America Inc.*, Misc. No. 320 (Fed.Cir. Sept. 2, 1992).

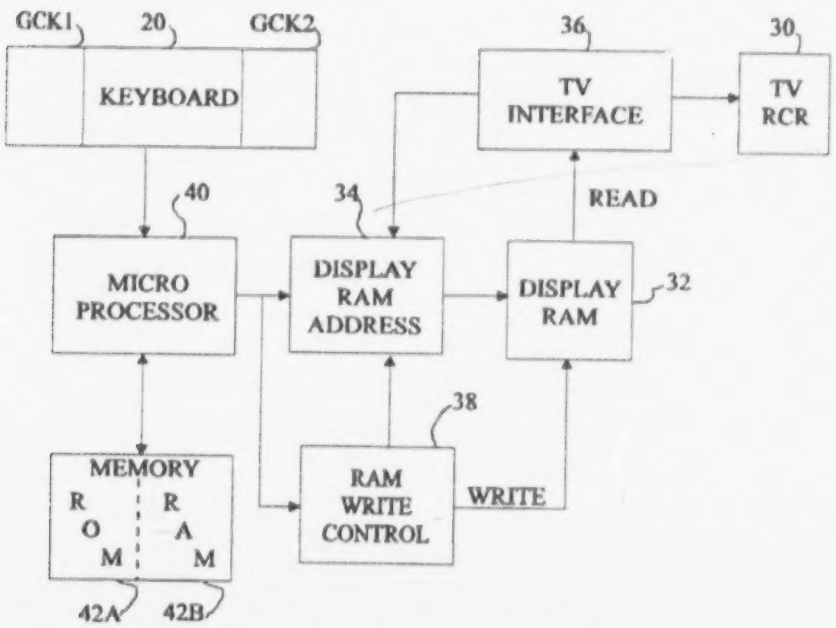
In order to resolve the outstanding questions of claim construction prior to trial, the district court held an evidentiary hearing with the assistance of a special master. The special master issued an initial report making specific recommendations on claim construction, which the district court adopted in part for purposes of instructing the jury. Following a four-week liability trial, the jury returned a verdict for Alpex. After this liability verdict, Nintendo filed a motion for judgment as a matter of law (JMOL) as to infringement and validity or, in the alternative, for a new trial. The damages trial followed before the same jury. The jury awarded Alpex a royalty of 6% which, when computed on the stipulated $3.4 billion of allegedly infringing products sold by Nintendo, resulted in a damage award of $253,641,445.

Nintendo again filed motions for JMOL or a new trial and for a remittitur on damages. Alpex moved for entry of judgment and an award of prejudgment interest. The district court denied all of Nintendo's post-trial motions and entered judgment for Alpex with prejudgment interest.

Nintendo now appeals the judgment as to validity, infringement, and damages, and Alpex cross-appeals the amount of damages.

II.

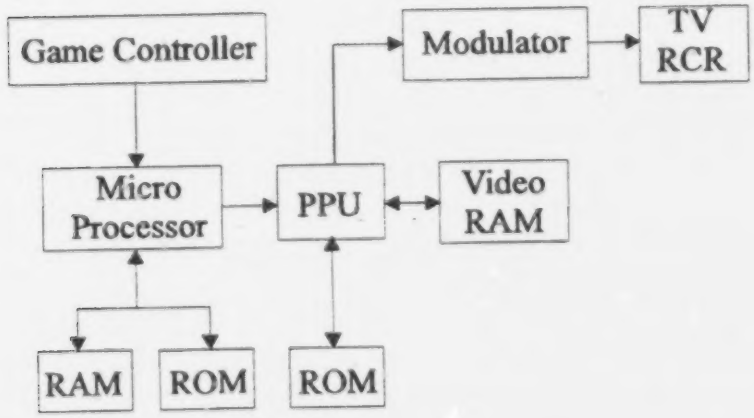
The '555 patent claims a keyboard-controlled apparatus for producing video signals by means of random access memory (RAM) with storage positions corresponding to each discrete position of the raster for a standard television receiver. Figure 2 of the '555 patent depicts the structure of the invention, as follows:




The television raster comprises numerous discrete dots or bars, approximately 32,000, which the cathode ray beam illuminates on

a standard cycle, which in turn creates the image on the television screen. The patented invention requires sufficient RAM to accommodate each of the approximately 32,000 memory positions needed to represent the raster image. Thus, the RAM holds at least one "bit" of data for each position in the memory "map" of the raster. Accordingly, this video display system is called "bit-mapping." The advantage of this system, as disclosed in the patent, is that it provides for the representation of every image within the raster RAM, or display RAM, and thereby provides greater control of the display for the manipulation of complex images and symbols. To achieve this flexibility, however, bit-mapping requires the construction of each image within the display RAM before display, a process that requires the microprocessor to erase and rewrite each image. Because the microprocessor must refresh the display RAM for each frame to show the movement of images, the operation of the system is slowed down.

The accused NES with its game cartridges is also an apparatus for producing video signals by means of storage positions corresponding to discrete positions of the raster for a standard television receiver. A trial exhibit illustrates the NES:



The video display system for the NES does not include RAM with storage positions corresponding to each discrete position of the raster. Instead, the NES utilizes a patented picture processing unit, or PPU, to perform the generation of images on the screen. The PPU receives pre-formed, horizontal slices of data and places each slice in one of eight shift registers, each of which can store a maximum of 8 pixels. These slices of data are then processed directly to the screen. The PPU repeats this process to assemble the initial image on the screen. Thereafter it repeats the process as necessary to form changes in images throughout the progression of the game. Nintendo refers to the PPU as an "on-the-fly" system. It is undisputed that the NES video display system, using shift registers to process slices of images (as opposed to entire screens), is a faster means of displaying movement of images on the video screen than the bit-mapping of the RAM-based system of the '555 patent.

The claims at issue are 12 and 13 of the '555 patent:

12. Apparatus for playing games by displaying and manipulating player and ball image devices on the screen of a display tube, comprising

first means for generating a video signal representing a linear player image device aligned in a first direction,

second means for generating a video signal representing a ball image device,

manually operable game control means, and

means responsive to said manually operable game control means for causing said first means to generate a video signal representing the player image device rotated so that it is aligned in a second direction different from said first direction.

13. Apparatus according to claim 12, wherein said means for causing includes programmed microprocessor means and a replaceable memory having program game instructions stored therein for controlling said microprocessor means, whereby

different games may be played with said apparatus by replacing said replaceable memory.

The parties dispute the proper claim construction of independent claim 12 (and thus dependent claim 13) and specifically the meaning and scope of "means for generating a video signal."

III.

Claim construction is a matter of law, which we review de novo. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 988, 34 USPQ2d 1321, 1337 (Fed.Cir.1995) (in banc), *aff'd*, — U.S. —, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Here, the district court submitted the issue of claim construction to a special master. The special master construed the pertinent means-plus-function claims of the '555 patent based on the disclosed structure contained in the patent specification and drawings. *See* 35 U.S.C. § 112, ¶ 6 (1994). The following jury instruction with regard to the video display system claimed in the '555 patent was proposed by the special master:

> The structure corresponding to the elements of claims 12 and 13 for generating a video signal is the Figure 2 components without the television receiver and the keyboard. These components cooperate together to create a video signal as follows: The linear player image device and the ball image device to be displayed on the video unit 30 are stored as data within ROM 42A. The "intelligence" of the system is provided by micro-processor 40. The operation of the micro-processor 40 is under the control of a program stored in ROM 42A. Micro-processor 40 causes this information in ROM 42A to be written into RAM 32 by using the write control circuit 38. RAM 32 has discrete storage positions which correspond to each of the bars or pixels of the TV screen. TV interface 36 causes display RAM address 34 to scan each of these storage positions in display RAM 32 to provide the video signal to the TV receiver 30.

Alternatively, the special master recommended leaving the issue of claim construction to the jury. The district court chose only to

adopt the first sentence of the special master's recommended jury instruction, relegating the remainder of the claim construction issues to the jury.

After the jury returned a verdict of infringement, Nintendo challenged on motion for JMOL the interpretation that the jury appeared to give the claim in reaching its verdict, but the district court denied Nintendo's motion. The court seemed to adopt the entirety of the claim interpretation of the special master in ruling on the JMOL motion and held that there was sufficient evidence to support the jury's presumed claim construction. Nintendo argues that, by denying its JMOL, the district court approved an erroneous claim construction, allowing claims for a RAM-based, bit-map video display system to read on a device that used a shift register-based, on-the-fly video display system.[1]

Nintendo argues that the '555 patent requires the use of a RAM memory map for all of the 32,000 pixels in the raster, whereas the NES uses shift registers that only provide for a maximum of 64 pixels. Because of this difference in structure, Nintendo contends that there can be neither literal infringement nor infringement under the doctrine of equivalents. Nintendo further contends that Alpex is barred from claiming that the NES infringes the '555 patent because during prosecution Alpex distinguished the invention of the '555 patent from a relevant prior art patent using shift registers.

In prosecuting its patent application before the Patent and Trademark Office (PTO), Alpex specifically distinguished the RAM-based, bit-map video display structure of the '555 patent from a prior art patent, Okuda, which claimed a shift register-based video display structure. Alpex explained to the PTO that, unlike Alpex's bit-map system, the Okuda video dis-

---

[1] Nintendo also challenges two other issues of claim construction in the '555 patent, including whether the claim term "linear player image" was properly construed and whether the patent required an on-board ROM. In view of our holding herein, we need not decide these other claim construction issues.

play system comprised an entirely different structure than the Alpex system. Specifically, Alpex noted that Okuda was unable to modify selectively a single pixel on the screen. Alpex explained:

> Applicants' display system utilizes a random access memory (RAM) 32 which is under the control of a micro-processor 40. When the keyboard is operated, as explained in the specification, micro-processor 40 extracts an appropriate image device from the read-only memory (ROM) 42A and transfers this particular image device directly into the appropriate location within the RAM 32. The random access capability is important since this enables the selected image device to be located directly in any desired area of the RAM 32.
>
> Okuda, in contrast, does not use a random access memory but, instead, employs a series of shift registers as his refresh memory 17 which corresponds to applicants' RAM 32. Because random access to the shift registers is not possible, Okuda is unable to selectively modify a single bit in the memory 17 but, instead, must operate on a line at a time to modify the stored display data.
>
> * * * * * *
>
> Okuda contemplates modification of one line of data at a time and there is no provision for modifying a single "dot." The random access techniques of applicants' invention enables any single point on the TV screen to be altered at will (under control of the micro-processor).

The district court, adopting the recommendations of the special master, did not expressly consider these statements for purposes of claim construction. The special master's report had noted that, because Alpex had made the above cited distinction with regard to claims not asserted by Alpex, this aspect of the prosecution history could not be used for purposes of prosecution history estoppel. Nintendo contends that the statements regarding the Okuda prior art patent were relevant and should have been con-

sidered for purposes of claim construction even though they may not give rise to prosecution history estoppel as to asserted claims 12 and 13. Alpex says nothing about the Okuda patent with regard to claim construction. It only argues that Nintendo waived any argument pertaining to Okuda for purposes of prosecution history estoppel.

IV.

Prosecution history is relevant not only for purposes of prosecution history estoppel but also for construing the meaning and scope of the claims. *See Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1270, 229 USPQ 805, 811 (Fed.Cir.1986) ("While it is true that the effect of prosecution history arises as an estoppel when applying infringement analysis under the doctrine of equivalents, the prosecution history can and should, where relevant, be assessed (along with, e.g., claim language and specification) in properly interpreting claim language." (citations omitted)); *McGill Inc. v. John Zink Co.*, 736 F.2d 666, 673, 221 USPQ 944, 949 (Fed.Cir.1984) ("Prosecution history may be used not only in an estoppel context but also as a claim construction tool."), *overruled on other grounds, Markman*, 52 F.3d at 976, 979, 34 USPQ2d at 1327, 1329. Indeed, prosecution history is a proper claim construction tool. *See Markman*, 52 F.3d at 980, 34 USPQ2d at 1330 ("To construe claim language, the court should consider the patent's prosecution history. . . ."); *Builders Concrete, Inc. v. Bremerton Concrete Prods. Co.*, 757 F.2d 255, 260, 225 USPQ 240, 243 (Fed.Cir.1985) ( "[T]he prosecution history of all claims is not insulated from review in connection with determining the fair scope of [a] claim. . . . To hold otherwise would be to exalt form over substance and distort the logic of this jurisprudence, which serves as an effective and useful guide to the understanding of patent claims.").

In this case, the Okuda patent is directly relevant to claim construction. The prosecution history of the '555 patent shows that the examiner rejected claim 1 of the application as being anticipated by Okuda. Claim 1 specified a series of limitations in means-plus-function format to a display control apparatus utilizing

a RAM-based, bit-map system. Alpex distinguished Okuda before the PTO based on the structural difference of a RAM-based versus a shift register-based video display system: "Claim 1, as amended, now clearly distinguishes over Okuda. The claim requires a random access memory which, as indicated previously, is not disclosed in Okuda." The special master gave no weight to the statements made by Alpex regarding Okuda because the statements concerned different claims. The district court apparently adopted this reasoning, but we discern no reason why prosecution history relating to the structure of the video display in the means-plus-function limitations of claim 1 is not pertinent to the same structure of the same display system in the means-plus-function limitations of claims 12 and 13. Paragraph 6 of Section 112 requires that we construe a means-plus-function claim in view of the structure disclosed in the specification of the patent. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388, 21 USPQ2d 1383, 1387 (Fed.Cir.1992); *In re Iwahashi*, 888 F.2d 1370, 1375, 12 USPQ2d 1908, 1911 (Fed.Cir.1989). Statements made during the prosecution relating to structures disclosed in the specification are certainly relevant to determining the meaning of the means-plus-function limitations of the claims at issue.

The district court recognized that claims 12 and 13, and the specification of the '555 patent, call for the use of a RAM-based, bit-map video display system. Moreover, the statements made by Alpex during prosecution with regard to the Okuda prior art patent emphasize that Alpex claimed a video display system based on the use of RAM capable of modifying a single bit, or pixel, on the television receiver. These statements distinguish any video display system based on shift registers, as shift registers do not allow the selective modification of a single bit in memory, that is, a single pixel. It is undisputed that the NES utilized this type of video display system. Indeed, Alpex's own technical expert, Mr. Milner, testified that the NES utilized shift registers, not RAM. Further, Mr. Milner explained that the NES could not directly modify a single pixel. Thus, Mr. Milner's testimony confirms that random access capability is not possible by use of shift

registers. In short, the structure and operation of the NES paralleled the structure and operation of the Okuda video display system.

Alpex attempts to distinguish Okuda from the NES because Okuda only allows the modification of horizontal lines on the raster, whereas the NES allows the modification of any 8-bit slice on the raster. This distinction, however, affects neither the structural similarities (both Okuda and the NES use shift registers) nor the pertinent functional similarities (both Okuda and the NES cannot modify a single pixel). Therefore, because Alpex admitted during prosecution that its claims do not cover a video display system based on shift registers as in Okuda, *i.e.*, it argued that a system based on shift registers is not structurally or functionally equivalent to a RAM based system that can randomly access a single bit, Alpex's claims cannot now be construed to cover the NES, which possesses the same structural and functional traits as Okuda.

V.

On the jury verdict form, Interrogatory 1 asked the following: "Do you find that claims 12 and 13 require a structure that includes a display RAM which has discrete storage positions which correspond to each of the bars or pixels of the TV screen?" The jury answered this question in the affirmative. This response is consistent with and supported by the prosecution history of the '555 patent.

The jury then found that the accused products, the NES and most of its accompanying game cartridges, infringed claims 12 and 13 of the '555 patent, implicitly finding structural equivalence between a RAM-based, bit-map video display system and a shift register-based, NES system under § 112, ¶ 6. The district court determined that these findings were supported by substantial evidence and denied the motion for JMOL. *See Kearns v. Chrysler Corp.*, 32 F.3d 1541, 1547-48, 31 USPQ2d 1746, 1751 (Fed.Cir.1994) (deeming reversal proper "only if the jury's factual findings, presumed or express, are not supported by substantial evidence or, if they are, that the legal conclusions

implied from the jury's verdict cannot in law be supported by those findings"); *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893, 221 USPQ 669, 673 (Fed.Cir.1984) ("[O]nly when the court is convinced upon the record before the jury that reasonable persons would not have reached a verdict for the non-mover, should it grant the motion for [JMOL]."). We review the district court's JMOL ruling applying the same standard. *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 821, 23 USPQ2d 1426, 1431 (Fed.Cir.1992).

The district court held that Nintendo had literally infringed claims 12 and 13 of the '555 patent based primarily on the testimony of Alpex's expert Mr. Milner that the distinction between a bit-map system and the NES "is insignificant and insufficient to defeat a claim of equivalence under section 112(6)." Accordingly, the district court concluded that the NES is not only a functional equivalent but also a structural equivalent to the bit-map structure. For the reasons stated above, however, the NES cannot infringe claims 12 and 13 of the '555 patent as equivalents under § 112, ¶ 6, under a proper claim construction.

"As in all cases involving assertions of equivalency, wherein the patentee seeks to apply its [means-plus-function] claims to structures not disclosed by the patentee, the court is required to exercise judgment." *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 846 F.2d 1369, 1371, 6 USPQ2d 1886, 1889 (Fed.Cir.1988). If an applicant specifically distinguishes a structure from what is claimed during prosecution, the applicant will be estopped from asserting a scope for the same claim that covers that structure. *Cf. Sofamor Danek Group, Inc. v. DePuy-Motech, Inc.*, 74 F.3d 1216, 1220, 37 USPQ2d 1529, 1531 (Fed.Cir.1996). During the prosecution of the '555 patent, Alpex described the means-plus-function limitation under § 112, ¶ 6, as not covering a shift register-based video display system. On JMOL, the district court endorsed a contrary claim interpretation thereby allowing, in error, Alpex to avoid limitations made before the PTO. Just as prosecution history estoppel may act to estop an equivalence argument under the doctrine of equivalents, positions taken before the PTO may bar an inconsistent position

on claim construction under § 112. *See, e.g., Advance Transformer Co. v. Levinson*, 837 F.2d 1081, 1083, 5 USPQ2d 1600, 1602 (Fed. Cir. 1988) ("Positions taken in order to obtain allowance of an applicant's claims are pertinent to an understanding and interpretation of the claims that are granted by the PTO, and may work an estoppel as against a subsequent different or broader interpretation.").

Moreover, while Mr. Milner's testimony purports to be an analysis of the structure of the specification and the accused device, it actually provides no more than an analysis of functional equivalency. Mr. Milner described the shift registers of the NES as storing "just one little slice of an object" to be imaged; whereas he said the bit-map system "stores the whole screen." He concluded that displaying a slice of an object is equivalent to displaying the "whole screen." Specifically, Mr. Milner testified that "the reason they are equivalent is by storing one line at a time and using it over and over and over again very quickly you can do the same thing." Thus, Mr. Milner concluded that by repeating the NES process the entire screen will eventually be imaged as is done with the bit map system. This is a conclusion, however, of equivalency of function—both systems store data and will eventually display an image on the whole screen. Mr. Milner did not compare the structure of the NES with the bit map structure disclosed in the specification. Moreover, the bit map structure was clearly distinguished over a shift register structure during the prosecution of the '555 patent.

Because Alpex defined its claims during the prosecution of the '555 patent as not covering a system using shift registers and because the testimony relied on by Alpex to establish infringement under § 112, ¶ 6, was based only on a functional, not a structural, analysis, we conclude the court erred in sustaining the jury verdict of literal infringement.

VI.

The district court also denied Nintendo's motion for JMOL on the issue of infringement under the doctrine of equivalents primarily based on its conclusion that the jury could reasonably have

found infringement under § 112, ¶ 6. The court reasoned that equivalence under the doctrine of equivalents is a slightly broader concept than equivalence under § 112, ¶ 6, and that, as a result, its discussion of equivalence for literal infringement applied equally to infringement under the doctrine of equivalents.

While equivalency under the doctrine of equivalents and equivalency under § 112, ¶ 6, both relate to insubstantial changes, each has a separate origin, purpose and application. *Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1043-44, 25 USPQ2d 1451, 1454 (Fed.Cir.1993). Under § 112, the concern is whether the accused device, which performs the claimed function, has the same or an equivalent structure as the structure described in the specification corresponding to the claim's means. *D.M.I. Inc. v. Deere & Co.*, 755 F.2d 1570, 1575, 225 USPQ 236, 239 (Fed.Cir.1985). Under the doctrine of equivalents, on the other hand, the question is whether the accused device is only insubstantially different than the claimed device. *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1517, 35 USPQ2d 1641, 1644-45 (Fed.Cir.1995) (in banc), *cert. granted*, — U.S. —, 116 S.Ct. 1014, 134 L.Ed.2d 95 (1996). The latter question often turns on whether the accused device performs substantially the same function in substantially the same way to achieve substantially the same result. *See id.* at 1518, 35 USPQ2d at 1645.

In this case, the court concluded, based on the testimony of Alpex's expert, Mr. Milner, that the jury's finding of infringement under the doctrine of equivalents was supported by substantial evidence. However, Mr. Milner's testimony that the claimed and accused devices were substantially the same in terms of function/way/result was merely conclusory as acknowledged by the district court. However, the court said that Mr. Milner's conclusory statements on function/way/result, when considered with his testimony in relation to infringement under the § 112, ¶ 6, were sufficient to establish infringement under the doctrine of equivalents.

As discussed earlier, however, Mr. Milner's testimony concerning § 112, ¶ 6, only related to equivalence of the functional result. Neither he nor the court considered whether the accused device and the claimed device operated in substantially the same way. Indeed, in describing equivalency for § 112, ¶ 6, purposes, Mr. Milner acknowledged that the accused and claimed devices do not operate in the same way. For example, Mr. Milner testified that the bit map system creates an image by copying the bit map (the entire stored image) into the display RAM and then reading out the entire image onto the full screen.[2] On the other hand, he explained that the NES creates an image by taking a piece of the image, placing it in temporary storage, and then reading only that piece of the image onto the screen.[3] According to Mr. Milner, by repeating this process "a little bit at a time" until the entire image is placed on the screen, the NES can achieve the same functional result as the bit-map system.[4] This

---

[2] Mr. Milner testified that "if we want to display an image on the screen using the bit-map technique that is described in the '555 patent, what we do is we make a copy ahead of time of this bit-map into this display RAM. And essentially what we do is we have locations in this RAM corresponding to each position on the screen." He went on to describe that "a full screen bit-map transfers an image that is stored in this memory, loaded by the microprocessor into this display RAM, put out on to the TV screen at the right time to make the picture of the little guy."

[3] Mr. Milner said about the NES system that "[t]hey don't hold the whole line. One of them holds this top line here, the other one holds this blank top line here. When the beam is going across and it's time to display these when the positions match, this little bit of information that had been in this temporary shift register gets spit out, goes through some additional circuitry and turns the beam on and off on the screen to paint the top of his head."

[4] Specifically, Mr. Milner said that if the NES process is performed "over and over," it also will have put an entire image on the screen. As he described "[w]e do one line and then the next and then the next, using the same hardware over and over, but still storing it until—little

testimony does not support a conclusion that the claimed system and the NES operate in substantially the same way.

The evidence in this case, therefore, does not support a finding of infringement under the doctrine of equivalents. The evidence fails to establish that the claimed and accused devices operate in the same way or that the differences between them are insubstantial. As discussed above, Alpex described its claims during the prosecution of the '555 patent as covering random access systems capable of changing a single bit. It did not and could not claim image generation by shift registers. As the Supreme Court has explained, the purpose of the doctrine of equivalents is to prevent others from avoiding the patent by merely making "unimportant and insubstantial changes and substitutions in the patent." *Graver Tank*, 339 U.S. at 607, 70 S.Ct. at 856. It is not meant to cover systems that are clearly defined as outside the bounds of the claims. In this case, using shift registers, instead of RAM, to process data for video display, is not merely an unimportant and insubstantial change.

Accordingly, because there is a lack of substantial evidence to support a finding of infringement either literally or under the doctrine of equivalents, the district court's judgment as to infringement and damages is reversed. Alpex's cross-motion on damages is, therefore, moot.

VII.

Nintendo also challenges the jury's finding that the '555 patent is not invalid. On JMOL, the district court made an exhaustive thirty-two page review of Nintendo's arguments relating to invalidity. We have carefully considered Nintendo's arguments and the district court's opinion on this issue and discern no error. Accordingly we affirm the judgment as to validity.

No costs.

*AFFIRMED-IN-PART* and *REVERSED-IN-PART*.

---

bit at a time—until we have put the entire image out to the screen."

**UNITED STATES DISTRICT COURT**
**FOR THE SOUTHERN DISTRICT**
**OF NEW YORK**

**ALPEX COMPUTER CORP.,**

**Plaintiff,**

**-against-**

**NINTENDO COMPANY, LTD.,**
**and NINTENDO OF AMERICA, INC.,**

**Defendants.**

**No. 86 Civ. 1749 (KMW)**

**December 2, 1994**

**MEMORANDUM OPINION & ORDER**

WOOD D.J.

A four-week liability trial in this complex patent case resulted in a jury verdict for plaintiff Alpex Computer Corp. ("Alpex"). The jury concluded (1) that Nintendo Company, Ltd. and Nintendo of America, Inc. (collectively "Nintendo") had infringed claims 12 and 13 of U.S. Patent No. 4,026,555 (the "'555 patent"), and (2) that the '555 patent was valid. The court subsequently conducted a two-week damages trial, at the conclusion of which the jury awarded damages of $208,266,418.00 and concluded that Nintendo had wilfully infringed the '555 patent. With respect to the liability trial, presently before the court are Nintendo's post-trial motions, pursuant to Rule 50(b), for (1) judgment of non-infringement as a matter of law, and (2) judgment of invalidity as a matter of law; and pursuant to Rule 59, for a new trial. With respect to the damages trial, presently before the court are Nintendo's motion for a remittitur or, in the alternative, for a new trial; and Alpex's motion for entry of judgment. For the reasons set forth below, the court denies defendants' motion for judgment of non-infringement as a matter of law; the court denies defendants' motion for judgment of invalidity as a matter of law; the court denies defendants' motion for a new trial of both liability and damages; the court denies defendants' motion

for a remittitur or judgment as a matter of law on damages; and the court grants in part and denies in part Alpex's motion for entry of judgment.

## LIABILITY

At issue in this litigation is whether the Nintendo Entertainment System (the "NES") infringes claims 12 and 13 of the '555 patent.[1] As is discussed in greater detail below, the '555 patent discloses certain video game technology. In 1990, Nintendo filed a motion for summary judgment on the ground that the '555 patent was invalid as anticipated under 35 U.S.C. § 102, and as obvious under 35 U.S.C. § 103. Alpex cross-moved for summary judgment of validity. In an Opinion and Order dated January 18, 1991 (the "1991 Opinion"), the Court denied both motions, finding that the question or whether the '555 patent was invalid as obvious raised a dispute of material fact precluding summary judgment.

Just prior to trial, Nintendo filed a motion for summary judgment of non-infringement, claiming that the video display generation technology used by Nintendo differs from that disclosed in the '555 patent. The court denied Nintendo's motion as untimely, but granted Nintendo leave to reassert its motion during trial. At the completion of Alpex's case, Nintendo renewed its motion for judgment of non-infringement as a matter of law. The court denied Nintendo's mid-trial motion, choosing to let the case go to the jury, and reserving the option of overturning the jury verdict later.

Pursuant to Fed. R. Civ. P. 50(b), Nintendo now renews its prior motions, seeking judgment as a matter of law that the '555 patent is invalid as obvious, and that the NES does not infringe the '555 patent. In the alternative, Nintendo moves for a new trial under Fed. R. Civ. P. 59.

---

[1] The complaint alleged infringement of claims 12, 13, 14, and 17, but in a pre-trial stipulation, Alpex dropped its claims with respect to claims 14 and 17.

## DISCUSSION

### I. LEGAL STANDARD FOR JUDGMENT AS A MATTER OF LAW.

Fed. R. Civ. P. 50(a)(1) sets forth the standard for granting a motion for judgment as a matter of law:

> If during a trial by jury a party has been fully heard with respect to an issue and there is no legally sufficient evidentiary basis for a reasonable jury to have found for the party with respect to that issue, the court may grant a motion for judgment as a matter of law against that party on any claim . . . that cannot under the controlling law be maintained without a favorable finding on that issue.

Such a motion may be granted only where "there is 'such a complete absence of evidence supporting the verdict that the jury's finding could only have been the result of sheer surmise and conjectures' or if the evidence is so overwhelming that reasonable and fair minded persons could only have reached the opposite result.'" *Lambert v. Genesee Hosp.*, 10 F.3d 46, 56 (2d Cir. 1993) (*quoting Sorlucco v. New York City Police Dept*, 971 F.2d 864, 871 (2d Cir. 1992)), *cert. denied*, 114 S. Ct. 1612 (1994).[2] In deciding a motion under Rule 50, made either before the verdict or after, the court may not weigh the evidence or pass on the credibility of witnesses, where credibility is at issue. Instead, the court must view the evidence most favorably to the party against whom the motion is made, and give that party the benefit of all legitimate inferences that may be drawn from the evidence. *See Samuels v. Air Transp. Local 504*, 992 F.2d 12, 14, 16 (2d Cir. 1993); *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1571 (Fed. Cir. 1986). The non-movant may not, however, rest solely on general denials or conclusory

---

[2] Because a Rule 50(b) motion involves procedural issues not unique to patent law, the Federal Circuit looks to decisions of the regional circuit, here the Second Circuit, for the standard applicable to such a motion. *See Sjolund v. Musland*, 847 F.2d 1573, 1576 (Fed. Cir. 1988).

statements. *See Johnston v. IVAC Corp.*, 885 F.2d 1574, 1578 (Fed. Cir. 1989). The parties' arguments are discussed below, in light of the foregoing legal standard.

## II. CLAIM CONSTRUCTION.

### A. Background.

Infringement and validity of the '555 patent turn on how one interprets claims 12 and 13 of the '555 patent, which are set forth in their entirety in the margin.[3] The claims are the section of a patent "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112. In the absence of an evidentiary conflict, claim interpretation is a question of law for the court. Johnston, 885 F.2d, at 1579-80. "But when the meaning of a term in the claim is disputed and extrinsic evidence is necessary to explain that

---

[3] Claim 12 provides:

> Apparatus for playing games by displaying and manipulating player and ball image devices on the screen of a display tube, comprising
>
> first means for generating a video signal representing a linear image device aligned in a first direction,
>
> second means for generating a video signal representing a ball image device,
>
> manually operable game control means, and
>
> means responsive to said manually operable game control means for causing said first means to generate a video signal representing the player image device rotated so that it is aligned in a second direction different from said first direction.

Claim 13 provides:

> Apparatus according to claim 12, wherein said means for causing includes programmed microprocessor means and a replaceable memory having program game instructions stored therein for controlling said microprocessor means, whereby different games may be played with said apparatus by replacing said replaceable memory.

term, then an underlying factual questions [sic] arises, and construction of the claim should be left to the trier or jury under appropriate instruction." *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 974 (Fed. Cir. 1985). To construe the claims, a court looks to the claim language, the accompanying specification, and the prosecution history of the patent. *Smithkline Diagnostics Inc. v. Helena Lab Corp.*, 859 F.2d 878, 882 (Fed. Cir. 1988.) Other claims and expert testimony may also be relevant. *Id.*

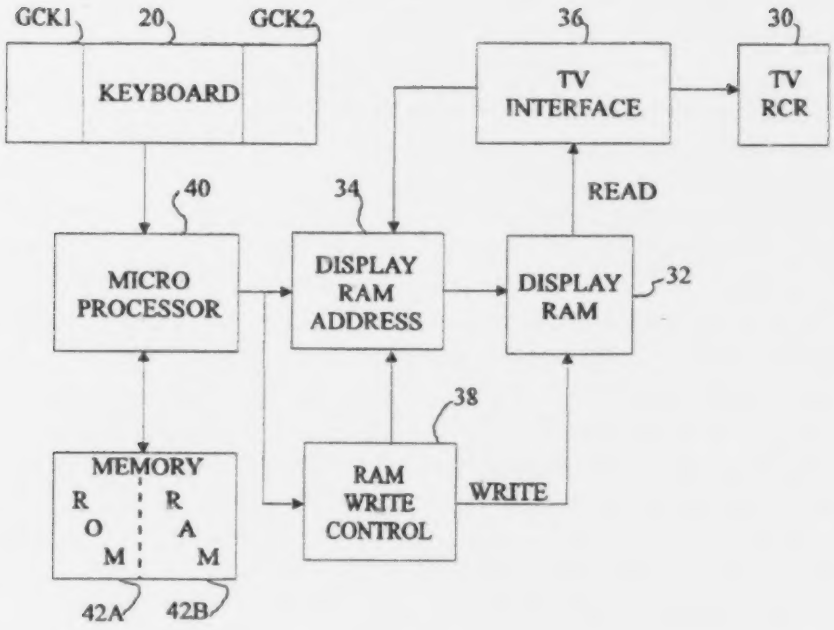
Claim 12 of the '555 patent is written in "means-plus-function" form, which means that the invention is described in terms of what it does, rather than in terms of its physical structure. *Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1042 (Fed. Cir. 1993). Claim 13 is "dependent from" claim 12, in that it incorporates the structural limitations of means-plus-function claim 12 by reference. Means-plus-function claims such as claim 12 are expressly authorized by the Patent Act, which provides the following explicit instruction for interpretation of such claims:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. § 112-6.

In the 1991 Opinion, the court concluded that in the first instance, claims 12 and 13 of the '555 patent are limited to the structure depicted in Figure 2 of the patent specification, except for the keyboard and television receiver. Opinion & Order, at 8-9, 13. Figure 2 is reproduced below.

Figure 2




Refining that construction further, the court concluded that the apparatus disclosed by these claims includes (1) a microprocessor, and (2) replaceable memory in the form of modular, plug-in units. Opinion & Order, at 10-11, 13. The court derived these limitations by reference to the specification and prosecution history of the patent.

On Nintendo's motion, the court certified for appeal certain questions relating to the claim construction contained in the 1991 Opinion. The Federal Circuit declined to take the appeal, and Nintendo subsequently moved in this court for reconsideration of the court's claim construction.[4] To assist in reconsidering the

---

[4] In letters sent to the Court subsequent to briefing on the motion to reconsider, it became apparent that the parties were in agreement that the court correctly construed the claims as the structure set forth in Figure 2 of the patent. Their dispute regarding claim construction was limited to whether and how that construction should be further refined.

claim construction, the court, with the consent of the parties, appointed a special master, Thomas L. Creel, from names submitted by the parties. On May 2, 1994, the special master conducted an evidentiary hearing to determine whether claims 12 and 13 require either replaceable memory and/or memory built into the game console, referred to by Nintendo, who advocated this construction, as "on-board ROM." Special Master Creel concluded in a May 7, 1994 Report ("Special Master's Initial Report") that the court had erred in previously limiting the ROM memory embodiment to "replaceable memory in the form of modular plug-in units." The Special Master's Initial Report is attached hereto as Appendix A. The Special Master recommended that, as a matter of law, the court simply construe the memory embodiment as that depicted in Figure 2 of the patent specification. Noting a dispute between the parties' experts regarding certain specification language, the Special Master proposed that the court leave to the jury any further construction of the ROM memory element (i.e., whether it necessarily requires replaceable memory and/or "on-board ROM"). Special Master's Initial Report, at 21. The court adopted the Special Master's recommendation with the intention of either construing the claims further during trial but prior to instructing the jury, or giving the question of further claim construction to the jury.

At the court's request and with the parties' consent, during trial, Special Master Creel recommended further refinement of the claim construction, based on evidence presented at trial and additional briefing provided by the parties. *See* Supplemental Report of Special Master on Claim Construction of Claims 12 and 13 of United States Letter Patent Number 4,026,555 (June 1, 1994) ("Special Master's Supplemental Report").[5] In his

---

[5] As noted *supra*, 35 U.S.C. § 112(6) requires construction of claims as covering the structure set forth in the specification *and equivalents thereof*. The Special Master's Supplemental Report was limited to construction of the structure set forth in the specification; he did not purport to identify "equivalents" to that structure. Special Master's Supplemental Report, at 2.

Supplemental Report, attached at Appendix B, the Special Master confirmed his earlier view that the court should leave the question of further construction of the ROM memory embodiment for the jury. He also concluded that there could be no relevant file wrapper estoppel based on file history regarding claim 1 and the Okuda prior art, and that therefore the jury should not be instructed on file wrapper estoppel. In addition, the Special Master recommended instructing the jury that the term "linear player image" is different from the term "player image," but that precise identification of that difference should be left to the jury.

Finally, the Special Master recommended a construction of the video display technology claimed in the '555 patent. Construction of this element of the claimed technology had been hotly contested. Alpex had promoted a construction limited only by the block diagram depicted in Figure 2, while Nintendo urged a construction of the display system that it labelled "bit-mapping," as opposed to "on-the-fly" technology used in the NES. Finding both proposals too simplistic, the Special Master recommended that the jury be instructed as follows:

> The structure corresponding to the elements of claims 12 and 13 for generating a video signal is the Figure 2 components without the television receiver and the keyboard. These components cooperate together to create a video signal as follows: The linear player image device and the ball image device to be displayed on the video unit 30 are stored as data within ROM 42A. The "intelligence" of the system is provided by micro-processor 40. The operation of the micro-processor 40 is under the control of a program stored in ROM 42A. Micro-processor 40 causes this information in ROM 42A to be written into RAM 32 by using the write control circuit 38. RAM 32 has discrete storage positions which correspond to each of the bars or pixels of the TV screen. TV interface 36 causes display RAM address 34 to scan each of these storage positions. In display RAM 32 to provide the video signal to the TV receiver 30.

Although more detailed, the Special Master's construction was closer to the "on-the-fly" construction advanced by Nintendo than the "Figure 2" construction proposed by Alpex. Notwithstanding his recommendation that the court instruct the jury as set forth above, the Special Master noted that in the alternative, the court might choose to leave further claim construction to the jury, reserving the option of reviewing the jury's construction on a post-verdict motion for judgment as a matter of law. *See* Special Master's Supplemental Report, at n.1. Before instructing the jury, the court adopted the Special Master's recommendations regarding the ROM memory embodiment, file wrapper estoppel, and the player image element. (Trial Transcript (hereinafter "Tr."), at 3806) With respect to the Special Master's recommended construction of the video display technology, however, the court deferred ruling, choosing instead to give the jury a partial claim construction, along with instructions on how to refine that construction further. *Id.* To guide the jury in refining the construction further, the jury verdict form requested that the jury choose between the parties' constructions, *i.e.*, (1) whether or not "claims 12 and 13 require a structure that includes a display RAM which has discrete storage positions which correspond to each of the bars or pixels of the TV screen;" and (2) whether or not "claims 12 and 13 require 'on board ROM,' that is read-only memory containing game instructions built into the console of the NES." See Memorandum of Law in Support of Nintendo's Motion for Judgment of Patent Invalidity as a Matter of Law (hereinafter "Nintendo's Invalidity Mem."), Exh. A (hereinafter "Liability Verdict Form"), at 1. The jury answered the first of these two questions "yes," that is, adopting a construction of the display technology consistent with the positions advanced by both Nintendo and the Special Master. The jury answered the second of these two questions "no," thereby adopting a construction of the ROM memory embodiment consistent with the view advanced by Alpex. *See id.* The jury also apparently concluded that 118 of the 149 accused games contained the requisite linear player image and ball image, as they defined those terms. In its post-trial motions, Nintendo attacks the jury's claim construction, as well as the infringement and validity conclusions that the jury drew

from its claim construction. Accordingly, set forth below is my claim construction of the video display element, the ROM memory element, and the linear player image and ball image elements, to the extent that these elements can be construed by the court as a matter of law.

**B. Video Display Technology.**

As noted above, the jury verdict form directed the jury to determine whether or not "claims 12 and 13 require a structure that includes a display RAM which has discrete storage positions which correspond to each of the bars or pixels of the TV screen." The jury answered this question in the affirmative, as had been urged by counsel for Nintendo. The wording of the construction proposed in this question was not as elaborate as the construction recommended by the Special Master, but it was explicitly taken from the Special Master's recommended construction, and it was designed to give the jury an opportunity to select the construction advocated by both Nintendo and the Special Master.[6]

On June 2, 1994, after the jury returned its verdict, I issued an oral order formally adopting the claim construction recommended in the Special Master's Supplemental Report, including the

---

[6] In its motion for a new trial, Nintendo argues that the phrasing of this question on the jury verdict form erroneously focused the jury's attention on the physical element of the structure, rather than the way in which those elements operate together. This objection is not well founded. First, use of the word "correspond" is suggestive of the way in which the physical elements work together. Second, this precise language, taken directly from the patent specification, was invoked on numerous occasions by counsel for Nintendo, as well as numerous technical witnesses, as long-hand for a video display system that operates by means of a bitmap. (Tr. at 693, 695, 1937-38, 1978-79, 3341) Nintendo cannot now plausibly be heard to argue that the jury may have thought this language referred to something other than what it had labeled a "bit-map" system. Finally, my instructions specifically directed the jurors to consider the way in which the systems operate in conjunction with their analysis of equivalents under both section 112(6) and the doctrine of equivalents. (Tr. 3971-72)

portions regarding construction of the video display technology on which I had previously deferred ruling. (Tr. 4024) Because the jury's verdict was consistent with these portions of the Special Master's Supplemental Report, my adoption of those portions was not intended to overrule the jury's claim construction of the video display technology, but to endorse it. Nonetheless, Nintendo maintains that had the jury been given the more elaborate construction advanced by the Special Master (rather than being left to construe the video display technology on its own), the jury would have had to come to a different conclusion on infringement. Therefore, my analysis of Nintendo's motion must address that contention. For substantially the reasons set forth in the Special Master's Supplemental Report, I find that as a matter of law, the video display technology disclosed in claims 12 and 13 of the '555 patent is that described by the Special Master in his Supplemental Report and excerpted *supra*.[7] To the extent that my instructions to the jury did not fully reflect that construction, I consider infra whether different instructions would have led to a different result.

**B. ROM Memory Element.**

As with the video display technology, the jury verdict form specifically asked the jurors to construe the ROM memory element of claims 12 and 13. More specifically, the verdict form asked whether "claims 12 and 13 require 'on board ROM,' that is read-only memory containing game instructions built into the console of the NES." The jury determined that the claims do not have this requirement, the outcome that had been urged by counsel for Alpex. In its motions for judgment of non-infringement and invalidity as a matter of law, Nintendo attacks the jury's construction of the ROM memory element, and the jury's infringement and validity findings based on that construction.

---

[7] As explicitly stated by the Special Master, this construction excludes "equivalents" under 35 U.S.C. § 112(6), discussed *infra*.

As noted *supra*, the court has considered the proper construction of the ROM memory element on several occasions. The issue was first addressed in the 1991 Opinion, where the court concluded that claims 12 and 13 require "replaceable memory in the form of modular plug-in units." The court reconsidered this construction pre-trial with the help of the Special Master, who recommended that the court withdraw this construction, limiting the ROM memory element as a matter of law only to ROM 42A, as depicted in Figure 2. The Special Master recommended that further refinement of this construction be left to the court or the jury at trial. The court adopted the Special Master's recommendation, and the case proceeded to trial. At the conclusion of trial, but before the case went to the jury, the Special Master reconsidered and reaffirmed his conclusion that the record presented a dispute of fact best resolved by the jury. In the alternative, he noted that the court could resolve the issue, but only by discounting the testimony of Alpex's expert, Ronald Milner. The court adopted his recommendation that further refinement of the ROM memory element be left to the jury. As noted above, the jury explicitly concluded that the claims do not require on board ROM.

In its Motion for Judgment of Non-Infringement, Nintendo argues that based on the patent specification, the patent file history, and expert testimony offered at trial, the court must conclude that the '555 patent requires on-board ROM as a matter of law. As the special master noted, the evidence on this issue reflects a dispute between the parties' experts. Nintendo argues that the testimony of Alpex's expert, Ronald Milner, is conclusory and therefore insufficient to create a dispute of fact precluding judgment as a matter or law.

Having reviewed the testimony at issue, I find that it is not merely conclusory, and that it provides sufficient basis for a reasonable jury to conclude that the '555 patent does not require on-board ROM. More specifically, I note that Mr. Milner testified accurately that neither the patent nor its file history contains the terms "on-board ROM" or "resident ROM." (Tr. 3512-13) Mr. Milner's testimony addressed each reference in the patent specifi-

cation about which Nintendo's expert, Dr. Stephen Ward, had testified. Mr. Milner explained why, contrary to Dr. Ward's testimony, these references do not specify a requirement of on-board ROM. (Tr. 3514-18) For instance, Dr. Ward testified that references in the specification, to the invention functioning as a calculator, to a menu of game options, and to initializing sub-routines, would indicate to a person of ordinary skill in the art that the invention contained on-board ROM. Mr. Milner countered that nothing about any of these characteristics indicated to him that on-board ROM was required, and that each of these characteristics could be present if the ROM were contained in cartridges (as opposed to built into the console). (Tr. 3514-17)

Nintendo emphasizes that in his supplemental report the Special Master noted that the court could disregard the foregoing Milner testimony and construe the claims as requiring on-board ROM. In suggesting that the court could disregard Mr. Milner's testimony, the Special Master did nothing more than summarize Nintendo's position in its mid-trial motion for judgment as a matter of law. In leaving construction of the ROM memory element to the jury, I determined that I could not, as a matter of law, disregard the Milner testimony. Similarly on the instant motion I cannot weigh the evidence or disregard the competent testimony of an expert. *D.M.I., Inc. v. Deere & Co.*, 802 F.2d 421, 425 (Fed. Cir. 1986) ("A trial judge presented with a motion for JNOV (1) must consider all the evidence in a light most favorable to the non-mover, (2) must not determine credibility of witnesses, and (3) must not substitute his or her choice for the jury's in finding facts, drawing inferences, or deciding between conflicting elements in the evidence."). Finding sufficient evidence upon which a reasonable jury could conclude that claims 12 and 13 do not require on-board ROM, I decline to overrule the jury's conclusion with respect to this issue of claim construction. To the extent that Nintendo's motion for judgment of non-infringement as a matter of law is based on its contention that the claims require on-board ROM, that motion is denied.

A corollary to the jury's reasonable conclusion that the claims do not require on-board ROM, is a finding that both claims con-

template the use of replaceable memory, either with or without on-board ROM.[8] The construction of this replaceable memory element bears on the jury's finding that the patent was not invalid as obvious. Citing prior art video game systems with replaceable memory, Nintendo attacks the jury's conclusion that the patent is valid. Alpex distinguishes the prior art cited by Nintendo on the ground that it lacks replaceable memory in the form of ROM cartridges. The parties' arguments present the question of whether the jury could permissibly conclude that the replaceable memory element of the claims is limited to replaceable ROM cartridges. As an initial point, I note that both parties have agreed with the court's construction of the claims as limited to the structure disclosed in figure 2, which represents the memory element containing game instructions as ROM 42A. This construction limits the memory element to ROM memory, regardless of whether it is replaceable. Moreover, having reviewed the testimony on this issue, I find substantial evidence on the basis of which a reasonable jury could construe the replaceable memory element as replaceable ROM cartridges. More specifically, Mr. Milner testified as one of ordinary skill in the art that "replaceable memory in the context of this patent means something that you can change the games with quickly and easily, and that really means a memory cartridge, a ROM cartridge." (Tr. 1799; *see also* tr. 1802-04) Mr. Milner distinguished memory in the form of replaceable ROM cartridges from "storage media," such as the audio cassette tapes used with certain prior art. (Tr. 3554-55)

Nintendo argues that Mr. Milner's construction of the replaceable memory element is erroneous as a matter of law, because it is impermissibly based on the specification. Nintendo's objection is unfounded. To the extent that Mr. Milner looked to the specification to construe the memory element of means-plus-function

---

[8] In this regard, the court notes that claim 13 explicitly requires replaceable memory. Although claim 12 contains no explicit reference to replaceable memory, for the reasons stated above, the jury could reasonably construe claim 12 as containing a memory element that can be either replaceable or resident.

claim 12, his analysis was dictated by section 112(6). *See In re Donaldson*, 16 F.3d 1189, 1195 (Fed. Cir. 1994). As for claim 13, reference to the specification was entirely appropriate as necessary to construe the specific term "replaceable memory." *See E.I. Du Pont de Nemours & Co. v. Phillips Petroleum*, 849 F.2d 1430, 1433 (Fed. Cir. 1988) (distinguishing properly looking to the specification "to interpret what the patentee meant by a word or phrase in the claim" from improperly reading a limitation into a claim from the specification "wholly apart from any need to interpret what the patentee meant by particular words or phrases in the claim.") Accordingly, I find no legal error in Mr. Milner's testimony regarding the replaceable memory element. If the jury used Mr. Milner's construction for purposes of consideration of the prior art, it does not constitute a ground for judgment of invalidity as a matter of law.

**C. Linear Player Image And Ball Image.**

In its motion for judgment of non-infringement as a matter of law, Nintendo claims that there was insufficient evidence for a reasonable jury to conclude that its video games contain the linear player image and ball image required by claims 12 and 13 of the '555 patent. As noted *supra*, in the Special Master's Supplemental Report, the Special Master recommended that the jury be instructed that the term "linear player image" in claims 12 and 13, is distinguishable from the term "player image" used in other claims. The special master recommended that further construction of those terms be left to the jury. The court adopted this recommendation and instructed the jury that the terms have different meanings. The jury was left to determine the meaning of these terms, as well as the meaning of "ball image," as that term is used in the patent. To assist the jury in this task, the court provided general instructions regarding claim construction. The jury verdict form did not contain specific questions directed to claim construction of these terms, so the jury's conclusions regarding the meaning of these terms are revealed only through its findings of infringement. To the extent that Nintendo's motion with respect to these elements is a motion for the court to con-

strue these terms as a matter of law, the court denies the motion for the reasons set forth below.

The doctrine of claim differentiation provides that "'where some claims are broad and others narrow, the narrow claim limitations cannot be read into the broad whether to avoid invalidity or to escape infringement.'" *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1574 (Fed. Cir. 1985) (*quoting*, *Deere & Co. v. Int'l Harvester Co.*, 658 F.2d 1137, 1141 (7th Cir.), *cert. denied* 454 U.S. 969 (1981)). By instructing the jury regarding the distinctness of the terms "linear player image," found in claim 12, and "player image," found in other claims, the court drew the legal conclusion dictated by the doctrine of claim differentiation. Any further construction of these terms requires weighing the conflicting testimony of the parties' experts regarding the meaning of these terms to one of ordinary skill in the art.

As an initial point, I note that the construction of the terms "linear player image" and "player image" is a question that is well suited to clarification through expert testimony. *See Snellman v. Ricoh Co.*, Ltd., 862 F.2d 283, 287 (Fed. Cir. 1988), *cert. denied*, 491 U.S. 910 (1989). Nintendo suggests that "linear player image" should be interpreted by reference to ordinary English usage. Nintendo's Non-Inf. Mem., at 56. Although the terms of a patent claim should be given their ordinary English meaning where possible, *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753, 759 (Fed. Cir. 1984), that meaning is by no means clear here, where the dictionary definition of "linear" is "of or relating to a line," *Webster's Third New International Dictionary*, 1315 (1976). As Nintendo's expert Dr. Stephen Ward conceded, the line between a linear image and a non-linear image is a difficult one to draw. (Tr. 3239, 3246)

Alpex's expert Ronald Milner, testified that a "linear player image," as opposed to a "player image," is a "player device that you can tell what direction it's pointing, . . . so you could tell that it had rotated." (Tr. at 1795) Nintendo argues that in proposing this broad construction of a "linear player image," Mr. Milner impermissibly eliminated any distinction between that term

and "player image," as used in claim 14 of the '555 patent. Claim 14 discloses a "means for moving said player image device linearly and for rotating said player image device." Nintendo argues that for the rotation required by claim 14 to be perceptible, the required "player image" would have to be indistinguishable from a "linear player image," as defined by Mr. Milner. Nintendo claims that this result is contrary to the court's claim construction that these two terms have distinct meanings. I do not agree that Mr. Milner's reading of the term "linear player image" necessarily runs afoul of my claim construction. As Alpex points out, "[t]he fact that, in Milner's opinion, the *separate requirement of rotation* in claim 14 further limits the 'player images' covered by that claim and may result in the scope of claims 12 and 13 being the same in terms of player images covered, does not change his opinion that the two terms, standing alone, are different in the way he described." Alpex's Memorandum in Opposition to Post-Trial Motion for Judgment of Non-Infringement (hereinafter, "Alpex's Non-Inf. Mem."), at n.15. Thus, when asked whether "linear player image," as used in claim 12, is narrower than "player image," as used in claim 14, Mr. Milner testified:

> I'm not sure if in the context of these claims in this patent that's true because in Claim 14, to tell rotation you would still have to be able to tell rotation to have — it refers to a rotating player image. If you couldn't tell, you wouldn't have rotation. *And what I inferred about linear was just a more specific thing about how you could tell that it rotated.*

(Tr. 2106) (emphasis added). If the jury found Mr. Milner's definition of "linear player image" more compelling than that proposed by Nintendo's expert, its conclusion was neither contrary to law nor unreasonable.

As noted above, Nintendo also challenges Mr. Milner's interpretation of the term "ball image," as used in the '555 patent. Mr. Milner testified that the "ball image" element in claims 12 and 13 requires neither continuous ball movement nor deflection. (Tr. 2161-64) Nintendo argues that this construction is erroneous

as a matter of law, because it is contrary to the following description of a "ball image," which is set forth in the specification at Column 2, lines 33-38:

> The image device which moves continuously until deflected by another image device is referred to as a ball whether the game is considered to be tennis or hockey, or whether the continuously movable image device is intended to represent a missile or the like.

Nintendo is correct in asserting that a patentee can serve as his own lexicographer, but he is bound by the meaning he gives to certain terms. *See ZMI Corp. v. Cardiac Resuscitator Corp.*, 844 F.2d 1576, 1580 (Fed. Cir. 1988). I cannot conclude, however, that Mr. Milner transgressed this rule of claim construction. First, I note that the specification explicitly presents the foregoing definition as "a particular example" of the claimed invention. (Tr. 2125) Mr. Milner cited other examples of ball images in the patent specification that are not limited by requirements of continuous movement and deflection. (Tr. 2162-63) Moreover, reference in claims other than claims 12 and 13, to a ball image that is continuously moving and subject to deflection, suggests that the term, as used in claims 12 and 13, is not so limited. *See D.M.I., Inc.*, 755 F.2d at 1574. Finally, even if the meaning of the term were limited by the definition cited by Nintendo, that definition suggests a broad conception of both continuous movement and deflection, in that a hockey puck does not necessarily move continuously and a missile is not generally deflected. In light of the foregoing, I cannot conclude that Mr. Milner's construction of the "ball image" was erroneous as a matter of law.

Nintendo's motion, as it applies to the "linear player image" and "ball image," is directed not only to the construction of those elements, but also to the finding of infringement based on those constructions. This latter issue is addressed *infra* in connection with the court's analysis of the jury's infringement verdict. Having construed the relevant patent claims, to the extent possible as a matter of law, the court turns to consideration of the jury's infringement and validity findings.

## III. INFRINGEMENT.

As a basis for its motion for judgment of non-infringement as a matter of law, Nintendo identifies three characteristics of the NES that purportedly put it outside the scope of the '555 patent. More specifically, Nintendo argues that (1) its "on-the-fly" display generation system does not infringe the bit-map display system either literally or under the doctrine of equivalence; (2) the '555 patent requires "on-board ROM," which the NES lacks; and (3) there was insufficient evidence to support the jury's conclusion that the accused NES games had the linear player image required by the '555 patent. Having considered each of these three arguments, as set forth in detail below, I hold that a reasonable jury could conclude that the NES infringes claims 12 and 13 of the '555 patent.

### A. Video Display Technology.

As noted above, Nintendo maintains that the NES does not infringe the '555 patent either literally, or under the doctrine of equivalence, because its video display generation system is substantially different from that required by the '555 patent. The video display generation system in the NES and that disclosed in the '555 patent (as construed by the jury and the Special Master in the Supplemental Report adopted by the court) are not identical in structure. Therefore, with respect to this element, the infringement dispute centers on whether the two display systems are equivalent under either section 112(6), or the doctrine of equivalence. *See* Alpex's Non-Inf. Mem., at 8; Reply Memorandum of Law in Support of Nintendo's Motion for Judgment of Non-Infringement as a Matter of Law ("Nintendo's Non-Inf. Reply Mem."), at 8-9.

#### 1. The legal definition of equivalents under Section 112(6) and the doctrine of equivalence.

In *Texas Instruments Inc. v. United States Int'l Trade Comm'n*, 871 F.2d 1054 (Fed. Cir. 1989), the Court of Appeals for the Federal Circuit suggested in dictum that there are similarities between equivalence analysis under section 112 and under the

doctrine of equivalents. In subsequent decisions, however, the Court of Appeals has repeatedly held that "section 112, paragraph 6, and the doctrine of equivalents have separate origins and purposes." *Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1043-44 (Fed. Cir. 1993); *see also In re Donaldson Co.*, 16 F.3d 1189, n.8 (Fed. Cir. 1994); *Intel Corp. v. U.S. Int'l Trade Comm'n*, 946 F.2d 821, 842 (Fed. Cir. 1991); *D.M.I., Inc.*, 755 F.2d at 1575.

Decisional law suggests two distinctions between "equivalents" under section 112(6) and "equivalents" under the doctrine of equivalence. First, under section 112(6), equivalents are identified by reference to the structure disclosed *in the specification*. These equivalents literally meet the claim and actually mark the bounds of the claims. By contrast, equivalents under the doctrine of equivalence are measured by reference to the structure disclosed *in the claims*. These equivalents fall outside the literal bounds of the claimed invention, and serve to extend the coverage of the patent beyond the literal claims. *See Valmont Indus., Inc.*, 983 F.2d at 1043 ("An equivalent under the doctrine of equivalents results from an insubstantial change which adds nothing of significance *to the claimed invention* . . . . In the context of section 112, however, an equivalent results from an insubstantial change which adds nothing of significance *to the structure, material, or acts disclosed in the patent specification*.") (emphasis added).

The second distinction between section 112(6) and the doctrine of equivalence is that section 112(6) requires an identity of function between the claimed invention and the accused device. *Id.* at 1042-43. Equivalence analysis under section 112(6), therefore, is limited to comparison of the structures at issue.[9] *Id.* ("'The sole question' under section 112 involves comparison of

---

[9] As the Special Master noted in the Supplemental Report adopted by the court, "structure" includes the manner in which component parts are assembled and how they work together. *See* Special Master's Supplemental Report, at 16.

the structure in the accused device which performs the claimed function to the structure in the specification."). By contrast, the doctrine of equivalence involves an equitable tri-partite test, which defines an equivalent as a device that "'performs substantially the same overall function or work, in substantially the same way, to obtain substantially the same overall result as the claimed invention.'" *Id.* (*quoting Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987), *cert. denied*, 485 U.S. 961 and *cert. denied*, 485 U.S. 1009 (1988)). The doctrine of equivalence therefore contemplates equivalents of the claimed invention that differ, albeit unsubstantially, with respect to function and result, as well as with respect to the structure or way in which the device operates.

In sum, the distinctions between section 112(6) and the doctrine of equivalence outlined above suggest that the doctrine of equivalence is a somewhat broader Concept. *See Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1539 (Fed. Cir. 1991) (inquiry of equivalency under the doctrine of equivalence "may not be as limited as under section 112(6)"). While an accused device might not literally infringe as a section 112 equivalent, it nonetheless could be found to infringe as a substantial equivalent under the doctrine of equivalents. *See Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1571 (Fed. Cir. 1986) ("When literal infringement under section 112 paragraph 6 is not present the doctrine of equivalents may nevertheless apply, and thereby secure to the patentee the fair scope of the patent"). On the basis of differences between the NES video display system and that disclosed in the patent, Nintendo maintains that the jury erred as a matter of law in concluding that the NES was an equivalent under either section 112(6) or the doctrine of equivalents. The parties' arguments with respect to each of these two forms of equivalence are discussed below.

**2. Equivalence analysis under Section 112(6).**

Nintendo claims that the jury erred as a matter of law in finding equivalence under section 112(6) between its video display technology, known as the Picture Processing Unit ("PPU"), and

the "bit-map" structure disclosed in the patent specification. Nintendo maintains that no reasonable jury could have concluded that the PPU adds nothing of significance to the invention claimed in the '555 patent, as construed by the special master and the court. I note that there appears to be no dispute that the two systems have the identity of function required for a finding of equivalence under section 112(6), so the inquiry is limited to whether they have equivalent structures. *See* Nintendo's Non-inf. Mem. at 15.

In support of its position Nintendo cites trial testimony identifying several distinctions between the "bit-map" technology disclosed in the '555 potent and the "on-the-fly" technology used in the NES.[10] More specifically, Nintendo argues that allegedly uncontroverted testimony demonstrated that:

> * An Alpex bit-map system stores a complete digital representation of a video image in a display RAM, before the image appears on the screen, whereas the NES on-the-fly system does not store the image before it reaches the TV screen.

---

[10] As noted *supra*, throughout trial Nintendo urged the court to construe the video display technology in the '555 patent as a "bit-map" technology, to be distinguished from the PPU, which Nintendo described "on-the-fly" technology. In his Supplemental Report adopted by the court, the Special Master rejected this terminology as too simplistic, choosing instead to construe the display technology in greater detail as set forth *supra*. I agree with the Special Master that the terms "bit-map" and "on-the-fly" are insufficient as claim construction. Thus, although I declined to adopt the Special Master's recommendation in instructing the jury, I avoided using the "bit-map" and "on-the-fly" terminology in the jury verdict form, choosing rather to ask the jury to determine whether the '555 patent required a structure that corresponds to a "bit-map" system. Nonetheless, for ease of reference, I will refer to the video display technology disclosed in the '555 patent as a "bit-map" system, and to the PPU as an "on-the-fly" system.

* An Alpex bit-map system requires that each object be erased and rewritten in the display RAM in order to show movement or rotation of the object, whereas the NES on-the-fly system does not require erasing and rewriting to show movement.

* An Alpex bit-map system enables control of each pixel or dot on the TV screen, whereas the NES on-the-fly system can control only a stamp on the screen.

* As compared to the Alpex bit-map system, the NES on-the-fly system requires substantially less memory, costs less, and is faster in generating video images.

* Due to their relative advantages and disadvantages, on-the-fly systems such as Nintendo's PPU became the method of choice for persons of ordinary skill in the art designing video games, whereas bit-map systems such as Alpex's are preferred by those designing personal computers.

Nintendo argues that these differences between the two video display systems are significant, as illustrated not only by the expert testimony at trial, but also by evidence of "real world" choices between the two technologies that each of the technical witnesses have made. Nintendo claims that any contrary testimony by Alpex expert Ronald Milner was unsupported, conclusory, and contrary to law.

In response, Alpex asserts first that there was ample evidence in Mr. Milner's testimony on which the jury could have concluded that the NES display technology is equivalent to that disclosed in the '555 patent. Second, Alpex claims that the distinguishing characteristics Nintendo emphasizes are no more than features added to the basic invention claimed in the '555 patent, and as such, these characteristics do not enable Nintendo to escape a finding of infringement. *See Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1057 (Fed. Cir.), *cert. denied*, 488 U.S. 825 (1988).

Having carefully reviewed the trial testimony, I find that there was sufficient evidence of equivalence between a "bit-map"

system and an "on-the-fly" system for a reasonable jury to find literal infringement under section 112(6). Mr. Milner's testimony regarding infringement was based, in part, on his conclusion that claims 12 and 13 should not be construed as limited to a "bit-map" system. This construction has of course been rejected by the special master, the court, and the jury. However, Mr. Milner testified in the alternative that were claims 12 and 13 construed as limited to a "bit-map" system, he would still consider the NES PPU an equivalent structure. (*See* Tr. 1899, line 18 - 1911, line 11; Tr. 3528-30, 3543-47) More specifically, in his direct testimony he discussed the bit-map and on-the-fly technologies as alternative technologies for computers to keep up with very fast television beams. (Tr. 1901-02). Mr. Milner characterized both technologies as a "crib note," whereby data is temporarily stored before being displayed on the television screen. (Tr. 1902, 1908) In slightly more technical terms, he explained the manner in which a "bit-map" system creates a display as follows:

> [I]f we want to display an image on the screen using the bit-map technique that is described in the '555 patent, what we do is we make a copy ahead of time of this bit-map into this display RAM. And essentially what we do is we have locations in this RAM corresponding to each position on the screen. We've divided the screen up into some arbitrary resolution. Suppose we want to display our image in the lower right-hand corner of the TV screen. What we do is we have this RAM organized parallel to the screen. The microprocessor loads this data into this RAM during the time that the beam is off the screen.

(Tr. 1905) He went on to explain how the bit-mapped image is read out of memory onto the television screen line by line, summarizing the system as one by which "a full screen bit-map transfers an image that is stored in this memory, loaded by the microprocessor into this display RAM, put out on to the TV screen at the right time to make the picture of the little guy." (Tr. 1906) Turning to the NES PPU, Mr. Milner explained that video display system as follows:

> What happens in those 2 millionths of a second, when it's time to display the top of the head of this image is the first line is fetched from the character ROM and put in a little bit of temporary storage, which is the PPU. . . . They don't hold the whole line. One of them holds this top line here, the other one holds this blank top line here. When the beam is going across and it's time to display these when the positions match, this little bit of information that had been in this temporary shift register gets spit out, goes through some additional circuitry and turns the beam on and off on the screen to paint the top of his head. . . . We do this over and over. We do one line and then the next and then the next, using the same hardware over and over, but still storing it until — little bit at a time — until we have put the entire image out to the screen.

(Tr. 1908-09) Significantly, Mr. Milner testified that it was not quite accurate to characterize the NES PPU as an "on-the-fly" system, because contrary to Nintendo's assertions, the images, or pieces of them, are temporarily stored by the PPU before being displayed on the television screen. (Tr. 1910; 2011-12).

On redirect, counsel asked Mr. Milner specifically to assume that "Claim 12 requires the microprocessor 40 in figure 2 to cause information in ROM 42A to be written into RAM 32 by using the write control circuit 38" and that "RAM 32 of figure 2 [has] discrete storage positions which correspond to each of the bars or pixels on the TV screen," *i.e.*, that claims 12 and 13 require a "bit-map" display system. (Tr. 3543-44) Mr. Milner then testified that he considered the NES PPU an equivalent to a "bit-map" system. He explained his analysis as follows, referring first to the PPU, and then to a "bit-map" system:

> The shift registers that, this temporary storage that we have heard a little bit about store the object one line at a time. They store it just one little slice of an object. This one stores the whole screen. And the reason that they are equivalent is by storing one line at a time and using it over and over and over again very quickly you can do the same thing. Using it over and over is a very equivalent thing to having a big board of it.

(Tr. 3544). Turning to the mechanism by which the images are relayed to the television screen, Mr. Milner explained his equivalence analysis as follows, again referring first to the PPU, and then to the "bit-map" system:

> [B]asically a shift register is very much like the conveyor belt that we saw in the [movie], it automatically goes along, dumps out one bit at a time to the screen. The TV interface in figure 2 actually has a counter connector to a random access memory, and it counts through in a fixed fashion going through one location after another. And a counter operating a RAM is a very equivalent structure to a shift register. It can't skip a cell, it go (sic) here, it can't go here. It goes through one cell after another just like the conveyor belt rolls them off.

(Tr. at 3545-46).

The primary difference between the structures of the display generation systems that emerges from Mr. Milner's testimony is that one stores the picture in pieces or stamps which are read out piece by piece onto the screen, while the other stores a fully constructed picture which is read out line by line onto the screen. Even if it were fully instructed with respect to the Special Master's claim construction, a reasonable jury could conclude, as apparently Mr. Milner has, that this distinction between a "bit-map" system and the NES PPU is insignificant and insufficient to defeat a claim of equivalence under section 112(6).

To conclude otherwise, I would have to disregard Mr. Milner's testimony in favor of that of Nintendo's expert, Dr. Stephen Ward. Contrary to Nintendo's assertions, the Milner testimony recounted supra is neither conclusory nor unsubstantiated. Using several demonstrative exhibits, Mr. Milner gave the lay jury a reasonably detailed explanation of his analysis of the equivalence between these highly technical systems. It is not for the court on a motion for judgment as a setter of law to weigh the credibility of witnesses or to disregard such testimony. *See Weldy v. Piedmont Airlines, Inc.*, 985 F.2d 57, 59-60 (2d Cir. 1993); *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 976 (Fed. Cir. 1985). In addition, notwithstanding testimony about differences in the

cost, speed, and favored applications of the two technologies, a finding of equivalence is supported by other witnesses' testimony describing their choices between the two technologies. (*see, e.g.*, Tr. 745-46, 753) Nintendo reads this testimony as proof that people of ordinary skill in the art, including the inventors, have long been aware of the differences between the two display systems, and that they have specifically chosen one system or the other based on these differences. However, an alternative reading of this testimony could be that although each technology has its advantages, the two systems are basically interchangeable. *See Palumbo*, 762 F.2d at 975 ("'An important factor (in the determination of equivalents) is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was.'") (*quoting Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 609 (1950)).

In light of the foregoing considerations, drawing all inferences in favor of Alpex, I conclude that a reasonable jury could find by a preponderance of the evidence that the NES PPU is a section 112(6) equivalent of the "bit-map" system claimed in claims 12 and 13, as construed by the special master and the court.

**3. Equivalence under the Doctrine of Equivalents.**

Nintendo challenges the jury's finding of equivalence with respect to the display technology under the doctrine of equivalents, as well as under section 112(6). Because, as discussed *supra*, equivalence under the doctrine of equivalents is a slightly broader concept than equivalence under section 112(6), my conclusion that a reasonable jury could have found equivalence under 112(6) applies equally well (if not with even greater force) in the context of the doctrine of equivalents. In its motion papers, however, Nintendo raises several objections to the jury's verdict that are peculiar to the doctrine of equivalents. First, Nintendo argues that the doctrine of equivalents is an equitable remedy that "only comes into play when an unscrupulous infringer attempts to evade the literal terms of the claims of a patent," a showing that Nintendo claims was not made

here. Second, Nintendo claims that the patent it obtained on the PPU is relevant to equivalence under the doctrine of equivalents, and that this evidence, together with that cited in connection with its section 112(6) argument, establish non-equivalence. Third, Nintendo complains that in violation of the Federal Circuit's decision in *Lear Siegler Inc. v. Sealy Mattress Co.*, 873 F.2d 1422 (Fed. Cir. 1989), Alpex's proof on the doctrine of equivalents lacked a sufficient explanation of why the overall function, way, and result of the Nintendo display system is substantially the same as a bit-map display system. I have considered each of these objections, as set forth below, and concluded that none of them provides a sufficient basis for overturning the jury's conclusions with respect to equivalence between the video display systems under the doctrine of equivalents.

The question of whether the doctrine of equivalents is applicable to a case, absent a showing of inequitable conduct, was thoroughly briefed and debated during trial. It is also the subject of the appeal in *Hilton Davis Chemical Co. v. Warner-Jenkinson Co.*, Appeal No. 93-1088 (Fed. Cir., argued Mar. 1994), currently pending en banc before the Federal Circuit Court of Appeals. As Nintendo points out in its brief, there is some evidence in recent decisional law that the Federal Circuit is moving toward a new conception of the doctrine of equivalents, requiring not only a showing of equivalence under the tri-partite function/way/result test articulated in *Graver Tank & Mfg. Co. v. Linde Air Prods Co.*, 339 U.S. 605 (1950), but also a showing of inequitable conduct on the part of the alleged infringer. *See Charles Greiner & Co. v. Mari-Med Mfg., Inc.*, 962 F.2d 1031, 1036 (Fed. Cir. 1992); *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991); *Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 932 F.2d 1453, 1457 (Fed. Cir. 1991). As I noted at trial, however, none of the foregoing decisions unequivocally amends the time-honored *Graver Tank* test. (Tr. 3332) In the absence of such an unequivocal statement, I decline to find error in the jury's doctrine of equivalents conclusion on this basis.

As a second basis for attacking the jury's doctrine of equivalents finding, Nintendo claims that in addition to evidence of the difference between the PPU and a "bit-map" system noted above, "[t]he patent examiner's decision to grant Nintendo a patent [on the PPU] over the Alpex patent further establishes that Nintendo's on-the-fly system is not equivalent to Alpex's bit-mapped system." Nintendo's Non-Inf. Mem., at 40-1 (emphasis added). In support of this argument, Nintendo cites *Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948 (Fed. Cir. 1993). The *Hoganas* court noted that the issuance of a patent for an accused product is relevant to the question of equivalence under the doctrine of equivalents. *Id.* at 954. Accordingly, prior to trial, I denied Alpex's motion *in limine* to exclude evidence of Nintendo's PPU patent. I also instructed the jury that they could consider the PPU patent in connection with their analysis. (Tr. 3973) While the PPU patent may be relevant to the question of equivalence, however, it does not "establish" non-equivalence. Nothing in the *Hoganas* decision alters the rule that issuance of a patent is not a defense to infringement. *See Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569 [224 USPQ 409] (Fed. Cir. 1984). The fact that the patent office issued a patent for the NES PPU does not alter my conclusion that a reasonable jury could conclude that the PPU is equivalent to a "bit-map" display system under the doctrine of equivalents.

As a final basis for attacking the jury's doctrine of equivalents conclusion, Nintendo argues that Alpex failed to explain equivalence fully, as required under *Lear Siegler*, 873 F.2d 1422. The Lear Siegler court outlined the following requirements for proof under the doctrine of equivalents:

> Thus, while infringement under the doctrine requires "only" substantial identity, substantial identity must be proven with regard to all three elements of the doctrine specified in *Graver Tank*: *function* performed, *means* by which function is performed, and *result* achieved. In order to assure such separate analysis, . . . a jury must be separately directed to the proof of each *Graver Tank* element. The party asserting infringement must present "*evidence* and *argument* concerning

> the doctrine and *each of its elements*" The evidence and argument on the doctrine of equivalents cannot merely be subsumed in plaintiff's case of literal infringement. Accordingly, the fact that there was evidence and argument on literal infringement, that may also bear on equivalence, does not satisfy *Nestier*.

*Id.* at 1425 (*quoting and citing Nestier Corp. v. Menasha Corp.—Lewisystems Division*, 739 F.2d 1576 (Fed. Cir. 1984), *cert. denied*, 470 U.S. 1053 (1985)). Both *Lear Siegler* and *Nestier* are distinguishable from this case. In *Lear Siegler*, the only testimony that the plaintiff could point to supporting its doctrine of equivalents case was cross-examination testimony of its expert on the structural *differences* between the claimed invention and the accused product. *Lear Siegler*, 873 F.2d at 1426. In *Nestier*, plaintiff's expert refused to state an opinion with respect to equivalence, and plaintiff's trial counsel disavowed any theory of infringement under the doctrine of equivalence. *Nestier*, 739 F.2d at 1580. In this case, although Mr. Milner's testimony regarding equivalence under the doctrine of equivalents was brief, it was substantially more thorough than that offered in either *Lear Siegler* or *Nestier*. In response to questions from counsel, Mr. Milner testified that the NES performs substantially the same function, in substantially the same way, to achieve substantially the same result as each of the elements of claim 12. (Tr. 1912-15) Noting that dependent claim 13 incorporates the same elements as claim 12, adding two additional requirements, he testified that the NES also infringes claim 13 under the doctrine of equivalents. (Tr. at 1915) Viewed in isolation, Mr. Milner's testimony may appear conclusory. Even so, it is more extensive than that considered in *Lear Siegler* and *Nestier*. Moreover, Mr. Milner's testimony must be viewed in the context of his more lengthy discussion of equivalence under section 112(6) discussed supra. Before pronouncing his conclusions with respect to the doctrine of equivalence, Mr. Milner explicitly incorporated his previous section 112(6) testimony by reference. (Tr. 1912) Although proof for purposes of the doctrine of equivalents should not be completely subsumed into proof of literal infringement. *Lear*

*Siegler*, 873 F.2d at 1425, in a case involving equivalence analyses under both section 112(6) and the doctrine of equivalents, as long as the elements of the doctrine of equivalents are explicitly reviewed for the jury, it is unnecessary for counsel to elicit wholly redundant testimony regarding equivalence.[11] In this case. Mr. Milner's testimony regarding the doctrine of equivalents, together with his discussion of equivalence under section 112(6) and the argument of counsel, were sufficient to prevent the jury from being "more or less put out to sea without guiding charts when called upon to determine infringement under the doctrine." *Id.* at 1426.

For the foregoing reasons, I decline to hold as a matter of law that the jury erred in concluding that the NES video display system is equivalent (under both section 112(6) and the doctrine of equivalents) to that claimed in claims 12 and 13 of the '555 patent. To the extent that Nintendo's motion for judgment of non-infringement as a matter of law is based on these grounds, it is denied.

**B. ROM Memory Element.**

Nintendo maintains that the jury erred in finding infringement, not only because of differences in the video display systems at issue, but also due to differences in the ROM memory element, and the player images. Turning to Nintendo's arguments with respect to the ROM memory element, I find insufficient basis for judgment as a matter of law. As noted in the discussion of claim construction, *supra*, the court cannot conclude as a matter of law that the '555 patent requires "on-board ROM." A reasonable jury could have resolved the conflicting expert testimony in favor of Alpex, as the jury did in this case, concluding that the patent does not require "on-board ROM." Accordingly, the ROM memory element does not preclude the jury's conclusion that the NES,

---

[11] In this regard, I note that *Lear Siegler* did not involve means-plus-function claims requiring analysis of equivalents for purposes of both literal infringement and infringement under the doctrine of equilavents. *See Lear Siegler*, 873 F.2d at 1423.

which does not contain "on-board ROM," infringes the '555 patent.

**C. Linear Player Image.**

As a third and final basis for its motion for judgment of non-infringement as a matter of law, Nintendo claims that there was insufficient evidence for the jury to conclude that the 149 accused games infringed the linear player image and ball image elements of claims 12 and 13. For the reasons cited below, I decline to overturn the jury's verdict on this ground.

As noted *supra*, the special master recommended that the jury be instructed that there is a distinct meaning for the term "linear player image," used in claim 12 of the patent and incorporated by reference in claim 13, as compared to the term "player image," used in other claims of the '555 patent. He recommended that any further definition of these terms be left to the jury to decide on the basis of expert testimony that had been presented on the issue. The court adopted this portion of the Special Master's Supplemental Report and instructed the jury accordingly.

The verdict form does not reveal the jury's construction of either "linear player image" or "ball image," but the jury's infringement verdict suggests that it adopted the constructions advanced by Alpex. As noted *supra*, I cannot conclude that the construction of "linear player image" and "ball image" advanced by Alpex's expert Mr. Milner was erroneous as a matter of law. Accordingly, to the extent that Nintendo challenges the infringement verdict as impermissibly based on Mr. Milner's construction, I deny the motion.

Nintendo's motion with respect to these elements reaches beyond the question of claim construction, however. More specifically, Nintendo claims that there was no competent evidence in the record on which the jury could have found a "linear player image" and a "ball image" in the accused games. Nintendo complains that Mr. Milner played only three games for the jury, and Alpex's proof with respect to the remaining games was limited to Mr. Milner's conclusory testimony that he had

played the remaining 149 accused games and found similar infringing characteristics in each of them. (Tr. 1882-90) As Nintendo recognizes, however, under Rule 705 of the Federal Rules of Evidence a patentee may rest its case on summary expert testimony that the accused product infringes the patent. *See Symbol Technologies, Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1576 (Fed. Cir. 1991). At trial Nintendo challenged Mr. Milner's claim construction of "linear player image" and "ball image," but it did not introduce evidence rebutting the infringement conclusions he drew on the basis of that construction. As noted supra, I have rejected Nintendo's objections with respect to claim construction of these elements. As for the infringement analysis, Nintendo cannot now recoup for its failure to introduce evidence rebutting Mr. Milner's testimony that each of the accused games contains a "linear player image" and a "ball image," as he construed those terms. *Id.* To the extent that Nintendo challenges the jury's infringement verdict on the basis of these elements, Nintendo's motion must be denied.

To summarize, I read the jury's answer to question number one on the verdict form as reflecting a construction of the video display technology claimed in claims 12 and 13 as one that operates as a "bit map" system. To the extent that this was not the jury's conclusion, its claim construction of that element is overruled. I cannot conclude, however, that the jury's construction of the ROM memory element, or the "linear player image" and "ball image" elements was erroneous as a matter of law. Both of these latter claim construction issues presents a dispute of fact best left to the jury. A reasonable jury could resolve those disputes as the jury did in this case, and find these elements present in the NES when used together with the game cartridges. Similarly, a reasonable jury could conclude, as I believe the jury did here, that the NES PPU is an equivalent to a bitmap system. For these reasons, Nintendo's motion for judgment of non-infringement as a matter of law is hereby denied.

## IV. VALIDITY.

Nintendo also challenges the jury's conclusion that the '555 patent is valid. Nintendo maintained at trial that the '555 patent is invalid as obvious, under 35 U.S.C. § 103. A patent claim is invalid as obvious if the invention set forth in the claim would have been obvious to persons of ordinary skill in the art at the date of invention. *See, e.g., Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1574 (Fed. Cir. 1986). The factors relevant to a finding of obviousness or non-obviousness were set forth by the Supreme Court in *Graham v. John Deere Co.*, as follows:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

383 U.S. 1, 17-18 (1966). Obviousness is ultimately a question of law for the court, to be based upon the factual underpinnings set forth in *Graham*. *See Jurgens v. McKasy*, 927 F.2d 1552, 1558 (Fed. Cir.), *cert. denied*, 112 S. Ct. 281 (1991). Where, as in this case, the ultimate legal question of obviousness was submitted to the jury, the court can review that legal conclusion *de novo* on a motion for judgment as a matter of law. *See id.*, at 1557-58. The court must be more deferential, however, to the jury's resolution of the underlying factual issues outlined in *Graham*. With respect to those issues, the court's inquiry on a motion for judgment as a matter of law is limited to analysis of whether the jury's verdict was supported by "substantial evidence," that is, "such relevant evidence from the record taken as a whole as might be accepted by a reasonable mind as adequate

to support the finding under review." *Orthokinetics, Inc.*, 806 F.2d at 1571. Notably, the factual findings underlying a conclusion of obviousness must be demonstrated by clear and convincing evidence, and this burden falls on the party challenging the validity of the patent, *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 716 (Fed. Cir. 1991) — in this case, Nintendo.

The jury answered a number of questions on the jury verdict form specifically directed to the ultimate question of whether claims 12 and 13 were obvious. First, the jury concluded that Alpex had "proven by clear and convincing evidence that the invention claimed in clams 12 and 13 of the '555 patent was invented before March 12, 1975, the date the patent application was filed," and that in fact Alpex had proven by clear and convincing evidence that the invention date was "on or before July 21, 1974." Liability Verdict Form, at 6. Asked whether Nintendo had "proven that the scope and content of the prior art relied on by Nintendo was more relevant to the '555 patent than the prior art considered and cited by the patent office examiner when he was considering whether to issue the "555 patent," the jury answered "no." *Id.* Addressing secondary considerations relevant to obviousness, the jury concluded that (1) the alleged invention had been commercially successful, (2) the alleged invention had satisfied a long felt need in the art, (3) others had tried and been unsuccessful in making the alleged invention, (4) the alleged invention had received praise from others in the art, (5) the alleged invention departed from accepted principles of the art, (6) the alleged invention was copied by others, including the accused infringer, (7) the alleged invention initially invoked skepticism from others possessing ordinary skill in the relevant art, and (8) a person or group working independently of the inventors had not arrived at the same or essentially the same concept as the inventors at about the same time. *Id.* at 6-8. Finally, the jury was asked the ultimate question of obviousness:

> Taking Claims 12 and 13 separately, and considering each claim as a whole, in view of (1) the scope and content of the prior art, (2) the difference between the prior art and the

claims at issue, (3) the level of skill in the art, and (4) (secondary considerations noted above), has Nintendo proven by clear and convincing evidence that the asserted claims would have been obvious when the claimed invention was made to a person having ordinary skill in the art to which the claimed subject matter pertains?

*Id.* at 8. With respect to both claims 12 and 13, the jury answered this question "no," finding both claims non-obvious. *Id.*

In its motion for judgment of invalidity as a matter of law, Nintendo challenges a number of the jury's factual determinations, as well as its ultimate conclusion with respect to obviousness. More specifically, Nintendo asserts that the jury erred with respect to (1) identification of the prior art, (2) relevance of the prior art cited by Nintendo, and (3) seven of the eight secondary considerations. Below, the court considers each of these issues to determine whether or not the jury's conclusions were supported by substantial evidence, and ultimately, to make its own determination with respect to obviousness.

**A. Identification Of The Prior Art.**

Part of the obviousness analysis involves comparison of the prior art to the patented invention, and to the prior art cited to the patent office. Nintendo relies primarily on three pieces of prior art: (1) an August 1974 issue of *Computer* magazine containing an article discussing the Flexible Recreational and Educational Device ("FRED"), developed by Radio Corporation of America ("RCA") in the early 1970s; (2) the FRED system itself, as described and demonstrated at trial by RCA research scientists who worked on the system in the 1970s; and (3) a September 1973 issue of *People's Computer Company Newspaper*, containing an article about a microprocessor-based home computer system.

As part of its motion for judgment of invalidity as a matter of law, Nintendo argues that the jury erroneously ignored all three of these pieces of prior art. With respect to the *Computer* magazine article on FRED, Nintendo argues that in concluding that the date of invention was on or before July 21, 1974, the jury

necessarily excluded the August 1974 article from the prior art. As for the *People's Computer Company* article, Nintendo claims that the jury must have disregarded it as insufficiently accessible to the public to constitute relevant prior art. Finally, with respect to the FRED prior art, Nintendo maintains that the jury erroneously ignored it because it believed FRED to be too experimental to constitute prior art. Such issues — relating to identification of the prior art — constitute questions of law for the court. *See General Motors Corp. v. United States Int'l Trade Comm'n*, 687 F.2d 476, 482 & n.11 (C.C.P.A. 1982), *cert. denied*, 459 U.S. 1105 (1983). The jury's factual determinations underlying these questions of law are, however, reviewed under the more deferential, substantial evidence test. *See Jurgens*, 927 F.2d at 1557. Applying these standards, the court reviews the jury's efforts to identify the prior art, as revealed in its validity findings.

**1. *Computer* magazine article on FRED.**

Nintendo assails the jury's validity findings on the ground that the jury erroneously concluded that the date of invention was on or before July 21, 1974, and therefore disregarded pertinent and invalidating prior art revealed in the August 1974 *Computer* magazine article. For the following reasons, I find Nintendo's objections unfounded. First, I cannot conclude that the jury erred in finding the date of invention was on or before July 21, 1974. Second, notwithstanding the jury's conclusion with respect to the date of invention, the jury may have considered the August 1974 *Computer* magazine article as prior art, given testimony of the magazine's availability typically preceding the month printed as the magazine date. Third, even if the jury concluded that the article itself did not constitute prior art, the contents of the article were before the jury in the form of testimony regarding the FRED prior art. Fourth, even if the jury erroneously ignored the article, I cannot conclude that a reasonable jury considering the article as prior art would have necessarily reached different conclusions regarding its relevance. These conclusions are spelled out in detail below.

The date of invention is presumed to be the date the patent application was filed with the Patent and Trademark Office ("PTO"), see Chisum, 3 *Patents* § 10.03[1][c], in this case March 12, 1975. To establish an earlier date of invention, the patentee must show, by clear and convincing evidence, either an earlier reduction to practice or an earlier conception, followed by diligent reduction to practice. *Id.* Conception is defined as

> "the complete performance of the mental part of the inventive act. All that remains to be accomplished, in order to perfect the act or instrument, belongs to the department of construction, not invention. It is therefore the formation, in the mind of the inventor *of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice*, that constitutes an available conception, within the patent law."

*Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985) (*quoting Gunter v. Stream*, 573 F.2d 77, 80 (CCPA 1978)).

At trial, Alpex advanced an invention date of April 1974 (Tr. 3817), offering the coinventors' testimony that they started talking informally about the invention in February 1974 (Tr. 407-08), and that they conceived of the elements of the invention in discussions between February and April 1974. (Tr. 413-16; 437-41; 726, lines 11-13; 1029-55; 1057-65) According to Mr. Kirschner, he pitched the idea of the invention to Norman Alpert, president of Alpex, at a meeting in early May 1974. (Tr. 442-46) On June 24, 1974, Mr. Kirschner went to work for Alpex to conduct a two-month feasibility study of the invention (Tr. 451-55), and October 10, 1974, Mr. Haskel joined Mr. Kirschner at Alpex to develop a working model of the invention. (Tr. 475-77; 1065). Mr. Kirschner testified that when Mr. Haskel joined Alpex, Kirschner told him that the invention they were to develop was essentially the invention they had conceived the preceding February through April. (Tr. 478)

As Nintendo correctly observes, the testimony of inventors, standing alone without corroboration, is insufficient to establish an earlier invention date by clear and convincing evidence. *See*

*Price v. Symsek*, 988 F.2d 1187, 1194 (Fed. Cir. 1993). The court instructed the jury regarding this corroboration requirement. (Tr. 3976) As Alpex conceded, it did not have any evidence to corroborate the April invention date. (Tr. 3907). Accordingly, the earliest date of invention suggested to the jury on the jury verdict form was "on or before July 21, 1974," the date on a document containing notes about the invention written by Alpex president Norman Alpert. The alternative dates presented to the jury were "on or after October 10, 1974," and "any other date (if so, fill in the date)." As noted above, the jury chose "on or before July 21, 1974."

On the one hand, Alpex argues that substantial evidence supports the factual findings underlying the jury's conclusion that the date of invention was on or before July 21, 1974, and that that conclusion was not reached in error as a matter of law. Nintendo, on the other hand, claims that the July 21, 1974 invention date is insufficiently corroborated, and the date of invention must be on or after October 10, 1974 as a matter of law. Conception and invention are questions of law that the court may review *de novo*, but the jury's findings of fact underlying those legal conclusions are reviewed deferentially. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947 (1987). The jury's factual findings include those explicitly stated in response to interrogatories, and the other findings necessary to support their conclusions. *See Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.*, 750 F.2d 1552, 1558 (Fed. Cir. 1984). In this case, factual issues underlying the date of invention include among others, the credibility of the witnesses in light of corroborating evidence and the date attributable to certain corroborative evidence, most notably the LEAD specification introduced as Plaintiff's Exhibit 617. The court reviews these factual determinations for substantial evidence, and only thereafter gives *de novo* review to the legal conclusion of conception.

In light of the court's instruction on corroboration, the jury is presumed to have found sufficient corroboration for the July 21, 1974 date. The court considers, therefore, whether that finding

was supported by substantial evidence. I agree with Nintendo that the July 21, 1974 Alpert notes standing alone do not sufficiently corroborate the inventors' testimony to support a finding by clear and convincing evidence that the invention was conceived on or before July 21, 1974. "Conception must be proved by corroborating evidence which shows that the inventor disclosed to others his 'completed thought expressed in such clear terms as to enable those skilled in the art' to make the invention." *Coleman*, 754 F.2d at 359 (*quoting Field v. Knowles*, 183 F.2d 593, 601 (CCPA 1950)). Mr. Alpert's notes, introduced as Plaintiff's Exhibit 611B, merely contain references to various games being contemplated, the rotation feature of the games, and the shape of the player images. (Tr. 463-67) They contain no reference to a microprocessor or to replaceable memory. (Tr. 609) No reasonable jury could conclude that these notes alone sufficiently corroborate the inventors' testimony to support a conclusion that at the time the notes were written all that remained to be accomplished was construction, not invention.[12]

Although the July 21, 1974 Alpert notes standing alone provide insufficient corroboration, one must recall that the corroboration requirement is tempered by a "rule of reason" analysis, pursuant to which "an evaluation of *all* pertinent evidence must be made

---

[12] Alpex argues that there in no requirement that a document show all elements of the invention to constitute corroboration. Alpex's Reply Memorandum in Opposition to Nintendo's Motion for Judgment of Patent Invalidity, at 3 (hereinafter, "Alpex's Invalidity Rep. Mem."). In finding the July 21, 1974 notes alone insufficient to corroborate a July 21 conception date, the court does not intend to create such a requirement. There is no requirement that corroboration be in the form of a document, nor must a corroborating document show the patent elements with the amount of specificity generally found in a patent specification. As Alpex aptly points out, each a requirement would effectively collapse the distinct concepts of "conception" and "reduction to practice." Nonetheless, the corroborating evidence must be sufficiently detailed to confirm that the inventors did in fact have a complete and firmly established conception of every element of the invention. *See e.g. Coleman*, 754 F.2d at 360.

so that a sound determination of the credibility of the inventor's story may be reached." *Price*, 988 F.2d, at 1195. Other documents predating July 21, 1974 that were introduced into evidence include minutes of an Alpex board meeting cursorily referencing the project, a letter offering Mr. Kirschner a position with Alpex, Mr. Kirschner's employment agreement, and other notes taken by Mr. Alpert identifying potential employees to work on the project. While these documents support portions of Mr. Kirschner's Story, none of them adequately corroborates complete conception prior to July 21, 1974, and Alpex does not suggest that they alter the quantum of corroborative evidence of that conception date. Alpex does argue, however, that a document entitled "Functional Project LEAD: Leisure Entertainment Action Development," dated August 8, 1974, corroborates the July 21, 1974 invention date. Alpex argues that the LEAD specification, which contains detailed descriptions of all of the elements of the invention, could not have been drafted from scratch between July 21 and August 8, 1974. (Tr. 3818) Alpex maintains that therefore, the LEAD specification, considered together with the July 21, 1974 notes, is sufficient corroborative evidence that conception occurred no later than July 21, 1974. Alpex Invalidity Rep. Mem., at 4. Nintendo does not suggest that the LEAD specification fails to disclose a complete idea of the invention. Rather, Nintendo questions the date attributable to the document.

Although the LEAD specification is dated August 8, 1974, there is conflicting testimony regarding whether that is the date the document was actually completed. Mr. Kirschner testified that everything contained in the document had been conceived by August 8, 1974, and that the document reflected his work during the summer of 1974. (Tr. 612-14) He testified further that the document was created to brief Mr. Alpert in preparation for a board meeting in September 1974, and to brief Mr. Haskel upon his arrival at Alpex in October 1974. (Tr. 612-13) He also testified, however, that Alpex's secretary had the habit of dating documents as of the date of their creation, and carrying that date through on subsequent revisions. (Tr. 617-18) This potentially conflicting testimony is further complicated by Mr. Haskel's

concession that he did not understand how they would achieve rotation, an element claimed in both claims 12 and 13, until several days after he joined Alpex on October 10, 1974. (Tr. 1133-34) Nintendo argues that this concession — by the co-inventor responsible for software design, that he did not fully understand this software concept before October 10, 1974 — indicates that the inventors did not have a definite and permanent idea of how to achieve this element before that time.

Notwithstanding Mr. Haskel's concession, the LEAD specification, dated (albeit questionably) August 8, 1974, describes a specific method for performing player rotation. Moreover, Mr. Alpert's July 21, 1974 notes reflect discussion of the rotation element (Tr. 464), suggesting that at that time, Mr. Kirschner, the author of the LEAD specification, had been working on the rotation element. Finally, Mr. Haskel testified that he learned how to achieve rotation only after joining Alpex *and* "after talking to Mr. Kirschner." (Tr. at 1134) In light of the foregoing, a reasonable jury could conclude that by August 8, 1974 Mr. Kirschner had written most of the LEAD specification, including the portion relating to the rotation element, and that in order to have done so, he had to have previously developed a complete understanding of each of the elements of the invention. *See Tennant v. Peoria & P. U. Ry. Co.*, 321 U.S. 29, 35 (1944) ("Courts are not free to reweigh the evidence and set aside the jury verdict merely because the jury could have drawn different inferences or conclusions or because judges feel that other results are more reasonable.")

Finding the foregoing facts supported by substantial evidence, the court is left to determine whether such facts establish a date of invention on or before July 21, 1974 by clear and convincing evidence. I find the LEAD specification, together with the July 21 Alpert notes, sufficiently corroborative of the inventors' detailed testimony regarding the scope of their discussions in the February to April timeframe, to conclude by clear and convincing evidence that on or before July 21, 1974, the inventors had developed a definite and permanent idea of an operative invention such that one of ordinary skill in the art could have constructed the

apparatus without unduly extensive research or experimentation. *See Sewall v. Walters*, 21 F.3d 411, 415 [30 USPQ2d 1356] (Fed. Cir. 1994)B. Accordingly, to the extent that the jury's validity conclusions were based on the July 21, 1974 invention date, those conclusions were not reached in error.

Although I do not think that it would have been error for the jury to exclude the *Computer* magazine article from its consideration of the prior art, I doubt that it did so. First, as Nintendo notes, the date attributable to a document may be other than its publication date where extrinsic evidence is offered supporting a different date. *See Canron, Inc. v. Plasser American Corp.*, 474 F. Supp. 1010, 1016 (E.D. Va. 1978), *aff'd*, 609 F.2d 1075 (4th Cir. 1979), *cert. denied*, 446 U.S. 965 (1980). Nintendo offered the testimony of Dr. Anthony Robbi that he typically received issues of *Computer* toward the end of the month preceding the cover date. (Tr. 2335-36) If the jury found this evidence probative of a date of publication preceding the July 21, 1974 invention date, the jury may have considered the *Computer* magazine article as prior art.

Even if the jury concluded that the August 1974 *Computer* magazine article did not in and of itself constitute prior art, the relevant information contained in the article was otherwise before the jury. As noted supra, the article at issue contained a description of the RCA's FRED home computer system. This article was not, however, the only evidence that Nintendo offered regarding the FRED system. In addition to the article, Nintendo presented RCA research scientists Dr. Anthony Robbi and Dr. Robert Winder, both of whom testified at length about the development of FRED in the early 1970s. Each of these witnesses referred to the *Computer* magazine article, as well as several other documents, as corroboration for their testimony regarding the various elements of the FRED system in use by early 1974. There is no suggestion that the jury's conclusion with respect to the date of invention kept it from considering this prior art evidence. Accordingly, even if the jury did err in its July 21, 1974 invention date, this error did not preclude it from

considering the prior art described in the August 1974 *Computer* magazine article.

In any event, as is discussed in detail *supra*, consideration of the *Computer* magazine article does not result in different conclusions with respect to the ultimate legal question of obviousness. Accordingly, to the extent that the jury may have erroneously excluded the article from the prior art that error does not warrant judgment of invalidity as a matter of law. *See General Motors Corp. v. United States Int'l Trade Comm'n*, 69 C.C.P.A. 116, 687 F.2d 476, 482 (C.C.P.A. 1982), *cert. denied*, 459 U.S. 1105 (1983).

**2. *People's Computer Company Newspaper* and the FRED work.**

Nintendo also complains that the jury erroneously excluded from the prior art evidence of RCA's FRED system, and an article contained in a September 1973 issue of *People's Computer Company Newspaper*. There is no suggestion that the jury's date of invention finding interfered with its assessment of these prior art references. Rather, Nintendo surmises that the jury erroneously excluded the FRED system on the ground that it was too experimental, and that the jury mistakenly ignored the *People's Computer Company* article because the jury found the article was insufficiently accessible to the public to constitute relevant prior art. There is no explicit basis in the jury's verdict for Nintendo's suspicion that the jury disregarded this prior art. As Nintendo notes, there was substantial unrebutted evidence that FRED was not abandoned, suppressed or concealed, but rather that it was fully developed and demonstrated to the public on several occasions. Similarly, the unrebutted evidence established that the *People's Computer Company* article was accessible to the public, with over 1,000 paid subscribers and distribution of over 5,000 copies of each issue to other publications, universities, libraries, and professional organizations. In light of the record evidence, Alpex does not contend that the jury could have ignored either the FRED work or the *People's Computer Company* article. In order to have done so, the jury would have had to ignore my

instructions, which Nintendo cites as correctly stating the law regarding identification of prior art. *See* Nintendo's Invalidity Mem., at 16, 23. The jury is presumed to have followed the court's instructions. *See United States v. Pforzheimer*, 826 F.2d 200, 205 (2d Cir. 1987). As is discussed in detail below, the jury's conclusions with respect to relevance of the prior art and obviousness are not inconsistent with consideration of the FRED prior art and the *People's Computer Company* article. Accordingly, I cannot conclude that the jury's validity-related findings do not reflect consideration of both the FRED work and the *People's Computer Company* article. To the extent that Nintendo's motion for judgment of invalidity as a matter of law is based on the contention that the jury overlooked this prior art, the motion must be denied.

**B. Scope And Relevance Of The Prior Art.**

None of the prior art references was considered by the PTO in conjunction with prosecution of the '555 patent. By relying on this prior art, Nintendo seeks to take advantage of the rule that "one may invalidate a patent more easily with prior art not considered by the examiner." *Jurgens*, 927 F.2d at 1558. In answer to an interrogatory directed to this issue, the jury concluded that the prior art cited by Nintendo was not more relevant than that considered by the PTO. Nintendo contends that in reaching this conclusion the jury erred as a matter of law. For the reasons stated below, I uphold the jury's verdict on this point.

Nintendo argues that the jury unreasonably concluded that the Alpex invention was distinguishable from the prior art. Nintendo argues that the evidence unequivocally establishes that the FRED prior art contained each of the elements of the invention disclosed in claims 12 and 13 of the '555 patent. More specifically, in the FRED prior art, Nintendo identifies an apparatus for playing games on a television set, using a microprocessor, bit map display memory, manually operable game control means, replaceable memory, on-board ROM, and multiple game playing capacity. As for the rotation element of the Alpex invention, Nintendo cites testimony of several witnesses that rotation was widely known in

the art at the time of the Alpex invention. In contrast, Alpex maintains that the prior art lacks several critical elements of the Alpex invention. Alpex claims that the evidence regarding the FRED prior art does not establish that FRED had (1) a linear player image; (2) a ball image; (3) rotation; (4) a microprocessor; or (5) replaceable ROM. Of these elements allegedly missing from FRED, Alpex finds only replaceable ROM revealed in the *People's Computer Company* article. On the basis of these alleged distinctions, Alpex asserts that a reasonable jury could conclude that the prior art cited by Nintendo was neither more relevant than that considered by the PTO, nor sufficiently analogous to the Alpex invention to render it invalid as obvious. A close reading of the record suggests that although Alpex may overstate its case, a reasonable jury could have found important distinctions between the prior art and the Alpex invention.

The content of the prior art is a fact question, resolution of which often turns on a jury's assessment of expert testimony. *See Bio-Rad Lab., Inc. v. Nicolet Instrument Corp.*, 739 F.2d 604, 611 (Fed. Cir.) (noting importance of jury's role in ascertaining the content of the prior art, including discerning level of ordinary skill and assessing expert credibility), *cert. denied*, 469 U.S. 1038 (1984). Such is the case here, where the experts' characterizations of the prior art teachings differ widely. As Nintendo claims, the *Computer* magazine article regarding FRED explicitly states that FRED had been developed "using the RCA COSMAC microprocessor." (Def's Ex. 200, at 20) Moreover, the *Computer* magazine article discloses a "linear player image" (as that term was defined by Mr. Milner) in the form of a cat's head. (Tr. 3775) The article also references games designed for FRED involving ball images, such as bowling and football. (Tr. 3774) Finally, the testimony of several trial witnesses, including the inventors and Alpex's expert Mr. Milner, confirms that methods for achieving rotation were known in the art prior to July 1974. (Tr. 3559). In light of the foregoing, no reasonable jury could conclude that the various elements of the Alpex invention were not at least separately known in the art at the relevant time.

The record is not so clear, however, that it would have been obvious to one of ordinary skill in the art to combine some of these elements as was done in claims 12 and 13 of the Alpex patent. *See In re Bond*, 910 F.2d 831, 834 (Fed. Cir. 1990) ("'obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination'") (*quoting Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140 (Fed. Cir. 1986). Specifically, Nintendo failed to adduce clear and convincing evidence that one of ordinary skill in the art would have understood how to combine the replaceable ROM-revealed in the *People's Computer Company* article with a microprocessor-based system such as FRED. Nintendo argues that it need not demonstrate the use of replaceable ROM in the prior art, and that it is sufficient to show that other forms of replaceable memory, such as tape cassettes, punch cards, and floppy disks, had been used with FRED. This argument raises questions regarding the proper construction of the replaceable memory element, which is explicitly claimed in claim 13, and which the jury could have reasonably found within the scope of claim 12. As is discussed in greater detail. *supra*, to the extent that Nintendo's motion for judgment of invalidity as a matter of law is based on a contention that no reasonable jury could have concluded that the claims require replaceable memory in the form of a replaceable ROM cartridge, that motion must be denied. First, in accordance with the court's construction, with which the parties have agreed, the replaceable memory element of the claims must be ROM. Second, there was substantial evidence at trial to support further construction of this replaceable memory as pluggable ROM cartridges.

Thus, a reasonable jury could have concluded that claims 12 and 13 cover replaceable memory in the form of a pluggable ROM cartridge. Nintendo has failed to prove by clear and convincing evidence that the prior art it cites teaches use of such replaceable ROM with a microprocessor-based home video game system. First, the *People's Computer Company* article standing alone does not necessarily indicate that it was known in the art

how to achieve this combination. The article presents a cursory outline of a proposed home computer system, concluding with an invitation for "discussions or other arrangements towards the realization of this idea." (Def. Exh. 240, at 5) As an alternative, Nintendo argues that the FRED prior art teaches the use of replaceable ROM with a microprocessor-based system. As the basis for this argument, Nintendo points to a reference to ROM in the *Computer* magazine article. The relevant reference in the *Computer* magazine article states: "Other possible attachments [for FRED] include light guns, extra memory (RAM), pre-stored programs or tables (ROM), and output relays for control uses." (Def. Exh. 200, at 21.) Testifying for Nintendo, Dr. Anthony Robbi interpreted this sentence as a reference to replaceable ROM to be used with the FRED system. (Tr. 2344) Alpex expert Mr. Milner testified to the contrary, however, that this statement did not necessarily refer to replaceable ROM. (Tr. 3772-73) Moreover, Dr. Robbi admitted that researchers at RCA never actually used semiconductor ROM with the FRED home video game system. (Tr. 2322-23) A reasonable jury seeking to resolve this conflicting testimony could conclude that the prior art, including the *Computer* magazine article, did not teach use of replaceable ROM with a FRED-type system.[13]

Similarly, there is conflicting evidence regarding whether one of ordinary skill in the art would have known how to combine the elements of the microprocessor-based system revealed in the FRED materials with methods for achieving rotation taught by existing arcade games. (*Compare* Tr. 3559 with Tr. 3350-53) Indeed, the patent examiner allowed claim 12 over prior art containing rotation, specifically noting that the prior art did not

---

[13] This conclusion is not altered by evidence of the use of replaceable ROM in either arcade versions of FRED (tr. 2358) or later models of the home FRED system. A reasonable jury could find the former distinguishable from the invention disclosed in claims 12 and 13 of the '555 patent; and the latter came after the date of invention for the Alpex invention (regardless of whether that date is July 21, 1974 or October 10, 1974).

teach use of the rotation element in a television game. In light of these substantial disputes over the content of the prior art, I cannot conclude that a reasonable jury would necessarily find the prior art cited by Nintendo (including the *Computer* magazine article) analogous to the invention disclosed in claims 12 and 13 of the '555 patent. Having found substantial evidence distinguishing the Alpex patent from the prior art cited by Nintendo, I find no error in the jury's apparent decision to disregard Dr. Ward's conclusory testimony that that prior art was more relevant than the prior art considered by the PTO.

**C. Secondary Considerations.**

In making patent validity determinations, courts generally look to a number of secondary considerations deemed relevant to the question of obviousness. Such considerations, most of which are probative of non-obviousness, must be proven by a preponderance of the evidence. In this case, eight such factors were presented to the jury for consideration. Nintendo now challenges the jury's findings with respect to seven of those eight factors. The court reviews those findings to determine whether, on the basis of the record presented at trial, a reasonable jury could have made them. However, the presence or absence of secondary considerations is not dispositive of the question of validity, and "the weight to be accorded evidence of secondary considerations is to be carefully appraised in relation to the facts of the actual case in which it is offered." *Cable Elec. Prods v. Genmark Inc.*, 770 F.2d 1015, 1026 (Fed. Cir. 1985). Accordingly, although the court may conclude that the jury reasonably found certain secondary considerations, in some instances, as noted below, the court may give these considerations less weight in its analysis of the ultimate question of obviousness.

**1. Commercial success.**

The initial commercial embodiment of the '555 patent was called the Channel F, a video game system marketed by Fairchild Computer Company under license from Alpex. Alpex presented no evidence of sales, profits or market share of Channel F and

Nintendo's witnesses testified that it was a commercial flop.[14] Alpex's case for commercial success rests primarily on the success of the Nintendo NES. A patentee asserting commercial success as evidence of non-obviousness must demonstrate a sufficient relationship between the commercial success and the patented invention such that the success can be attributed to the invention. *See Demaco Corp. v. F. Von Langsdorff Licensing, Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir.), *cert. denied*, 488 U.S. 956 (1988). Nintendo argues that Alpex failed to make this requisite showing and that in fact, the success of the NES is attributable to Nintendo's improvements — its high quality games, security chip, and intensive marketing efforts. Although the success of the NES is no doubt in large part due to the contributions Nintendo has made to the basic system disclosed in the Alpex patent, I find substantial evidence upon which a reasonable jury could have concluded that the success of the NES constitutes commercial success of the '555 patent. Notably, Nintendo executives attributed their substantial profits to the interdependence of their consoles and cartridges, *i.e.*, the use of replaceable memory in a home video game system, as is disclosed in the '555 patent. I will credit the jury's reasonable finding of commercial success based on this evidence. Cognizant of other factors that contributed to Nintendo's success, however, I will give this factor little weight in my determination of obviousness.

**2. Long felt need and failure of others.**

The jury determined that Alpex had demonstrated by a preponderance of the evidence that the invention disclosed in the '555 patent satisfied a long-felt need and accomplished something that others had tried and failed. Nintendo claims that there is

---

[14] In support of its claim of commercial success, Alpex cites evidence that Channel F was well received at a Consumer Electronics Show in 1976. This evidence goes to "praise by others in the art," a separate secondary consideration, the presence of which Nintendo does not contest. Alpex cannot double-count this evidence, finding in it substantial evidence of commercial success as well.

insufficient evidence for a reasonable jury to find that these two secondary considerations were present in this case. The evidence relating to these two considerations is related, so the court addresses them together.

First, Nintendo maintains that there was no evidence that any need for the Alpex invention had been recognized in the industry. Alpex responds that there was substantial evidence from which a reasonable jury could find a recognized need for a home video game system that would have sufficient flexibility to permit one to play multiple games, thereby avoiding boredom with the product, a problem that had plagued the predecessor Odyssey and Pong game systems. For example, Mr. Milner testified that in 1975, he and his colleagues at Atari began work on a flexible home video game system with replaceable ROM cartridges, at least partially in response to a fall-off in sales of its dedicated home video game, Pong. (Tr. 1750-51)

Nintendo counters that any need for a multi-game system had already been met by the FRED system, developed by RCA in the early 1970s. As noted *supra*, however, the FRED home computer system did not employ replaceable ROM prior to 1975,[15] and RCA had struggled to find other forms of replaceable memory that would be inexpensive, effective, and not so slow as to try a user's patience. The replaceable memory most commonly used with FRED was cassette tape, which, though better than other options considered by RCA researchers, was slower and more awkward than replaceable ROM. (Tr. 2384, 2534) In light of the evidence presented at trial, a reasonable jury could conclude that notwithstanding development of the FRED system, prior to development of the Alpex invention there remained a need for a flexible home video game system with fast and effective replaceable memory. The efforts of RCA researchers to solve problems relating to replaceable memory are probative not only

---

[15] A reasonable jury could conclude that the FRED arcade system, which employed ROM beginning in 1974 (Tr. 2358), was not analogous to the invention disclosed in the '555 patent.

of a recognized need, but also of failure by others to solve the problem addressed by the Alpex invention. In light of the foregoing, a reasonable jury could conclude that the Alpex invention satisfied a long-felt need in the industry and achieved what others had tried but failed.[16]

As I find substantial evidence to support the jury's findings with respect to these two considerations, I cannot overrule its findings. I am conscious, however, that there is substantial overlap in the evidence supporting these two considerations, and that their relevance to non-obviousness is somewhat duplicative. Accordingly, I will guard against the danger of double-counting these factors in my analysis of the ultimate question of obviousness.

**3. Departure from accepted principles.**

In addition to the foregoing, Nintendo also challenges the jury's conclusion that the Alpex invention represented a departure from accepted principles in the art. In support of the jury's conclusion, Alpex points to the deposition testimony of Mr. Lawson, an engineer, formerly of Fairchild Computer Corporation, the company that marketed the first commercial embodiment of the Alpex invention. Mr. Lawson testified, "Best I can recall, at one time, it was known throughout the industry that microprocessors would not be viable in video games," and that at least two companies in the industry indicated that they did not consider microprocessors viable for video games. This vague

---

[16] Nintendo also argues that there was insufficient evidence that the need for the Alpex invention had been felt for a long enough period of time to warrant crediting the invention with satisfying a long-felt need. As Alpex notes, however, the length of time necessary for a finding of long-felt need must be determined on a case-by-case basis, taking into consideration particularities of the industry. In this case, the jury could have reasonably identified a need for the Alpex invention beginning in 1972, when the limitations of the Odyssey game became apparent. The court cannot conclude as a matter of law that two years does not reflect a long-felt need in the electronics industry.

assertion is an insufficient basis for a finding of departure from industry principles. Mr. Lawson never identified a time frame, the industry, any particular people in the industry, or any accepted principles in the industry from which the Alpex invention departed. Moreover, other evidence at trial indicates that he could not have been speaking of the period of the Alpex invention. The testimony of every technical witness, including Mr. Milner and the Alpex inventors, indicates that many people in the industry were working toward development of a microprocessor-based video game system. As is discussed in greater detail below, articles in *Computer* magazine and *People's Computer Company* magazine suggest that others may have achieved this portion of the Alpex invention prior to the invention date. Even if the Alpex inventors were the first to develop a microprocessor-based system, it is clear that it was not an unfamiliar principle in the art. In sum, I find insufficient evidence to support a finding of departure from industry principles. No reasonable jury could reach that conclusion. Accordingly, I overrule the jury's finding on this point and will give that finding no weight in my analysis of obviousness.[17]

**4. Copying by others including the accused infringer.**

Before and during trial, Nintendo asked the court to conclude, as a matter of law, that there was insufficient evidence that Nintendo copied the Alpex patent. I denied Nintendo's motions and sent the question of copying to the jury. Nintendo now

---

[17] To augment the record on departure from industry principles, Alpex emphasizes (1) Mr. Lawson's praise for the Alpex invention, and (2) the fact that its inventors were able to design a system with replaceable ROM before others in the art. In citing this evidence, Alpex confuses departure from accepted principles with praise in the art, fat lure by others, and long-felt need. A patentee should not obtain credit toward a finding of non-obviousness merely by recharacterizing the same evidence in terms of another secondary consideration. Having considered the evidence in conjunction with other, more appropriate factors of non-obviousness, I will not consider it in my review of the jury's finding of departure from industry principles.

renews its objections to the copying evidence in both its motions for judgment of invalidity as a matter of law and for a new trial. The evidence suggesting that Nintendo copied the '555 patent consisted of the following: Mr. Uemura, the head of Nintendo's R&D II Department had access to the '555 patent at the time the NES was developed there; Mr. Uemura was familiar with the patent, as reflected in his notes referencing it in conjunction with the Blockbuster patent; two of the engineers who designed the NES disassembled the Atari 2600 and Colecovision systems. Added to the foregoing evidence is the similarity between the Alpex invention and the NES that formed the basis of the jury's infringement finding. Countering the inference that arises from this evidence is the testimony of Mr. Nakagawa, a Nintendo engineer who worked on the NES, that he did not know anything about the Alpex patent when he was designing the NES, he did not refer to it or its Japanese counterpart when he was designing it, and as far as he knows, no one else did. He conceded, however, that during the relevant period there were 12 or 13 engineers working in the R&D II department, and he was away from the department for several months.

In considering the foregoing evidence, I am mindful that on a motion for judgment as a matter of law, all inferences must be drawn in favor of the non-moving party. In light of this decisional rule, I determined at trial and remain convinced post-trial, that Alpex presented sufficient evidence to reach the jury on the question of copying.[18] Although there are legitimate reasons that the Nintendo engineers could have had access to the '555 patent, those reasons provided fodder for rebuttal, not a basis for

---

[18] Prior to the damages phase of the trial, Nintendo moved *in limine* to exclude evidence of copying. At that phase of the trial the standard of proof applicable to the copying allegation was "clear and convincing evidence," as opposed to the "preponderance of the evidence" that governed at the liability phase. Noting the distinction in the standard of proof, I granted Nintendo's motion to exclude the copying evidence at the damages phase, notwithstanding my decision to admit the evidence in during the liability phase.

exclusion of the evidence. I cannot conclude that no reasonable jury could have concluded that Nintendo copied the '555 patent.

**5. Skepticism.**

Nintendo claims that the jury erred as a matter of law in finding that the Alpex invention was greeted by skepticism among those of ordinary skill in the art. Alpex's proof on this point consists of Mr. Lawson's statements that, at one time, it had not been considered feasible to develop microprocessor-based video games, and the inventors' accounts of the reactions of television manufacturers to whom they demonstrated the invention. Nintendo argues that Mr. Lawson's statement was insufficiently specific to establish skepticism. As for the television manufacturers, Nintendo maintains that Alpex failed to establish that they were people of ordinary skill in the art or that their skepticism was a function of technological concerns.

For substantially the reasons noted in connection with the court's consideration of the "departure from accepted principles" factor, the court finds Mr. Lawson's testimony standing alone insufficient to support a finding of relevant skepticism. With respect to evidence of skepticism among television manufacturers, Alpex maintains that skepticism among those in the "industry" is sufficient, and that it need not show that the television manufacturers were people of ordinary skill in the art. Neither party cites a case explicitly addressing this issue. Nonetheless, in light of the fact that the purpose of the skepticism inquiry is to shed light on whether the invention would have been obvious to one of ordinary skill in the art, the court concludes that in the absence of a showing that the skeptics were people of ordinary skill in the art, evidence of their skepticism should be accorded little weight in the obviousness determination. In this case, Alpex has presented evidence that the skeptics included technical as well as non-technical representatives of television manufacturers. (Tr. 542) Moreover, Mr. Kirschner specifically testified that these technical representatives expressed skepticism. (Tr. 544-46). To the extent that this skepticism was a function of their concern over obtaining requisite approvals from the Federal Communications

Commission, it is irrelevant to the court's obviousness analysis. However, skepticism that these individuals expressed about the display technology and the use of microprocessors should be considered. The court is mindful that the full credentials of these "technical" representatives were not established and will discount the evidence of skepticism accordingly. Nonetheless, determination of the level of skill in the art is a question of fact for the jury. *See Graham*, 383 U.S. at 17. Upon Nintendo's motion, the jury was specifically instructed that any relevant skepticism had to be on the part of those with ordinary skill in the art. (Tr. 3983-84) In light of this instruction and the substantial evidence noted above, the court cannot conclude that the jury's skepticism conclusion was reached in error as a matter of law. *See Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1569 (Fed. Cir. 1992) ("When there was sufficient evidence to support the verdict in light of the entire record, and upon correct or unobjected instructions of law, the jury's verdict must stand.").

**6. Simultaneous invention.**

The court submitted to the jury one secondary consideration that goes to obviousness (as opposed to non-obviousness), *i.e.*, simultaneous invention — whether a person or group working independently of the inventors arrived at the same or essentially the same concept as the Alpex inventors at about the same time. The jury concluded that Nintendo had failed to prove simultaneous invention by clear and convincing evidence. Nintendo now asserts that this conclusion was reached in error as a matter of law. In support of this position, Nintendo claims that within six months to a year, researchers at Atari, Fairchild, and RCA had arrived at essentially the same concept as that disclosed in claims 12 and 13 of the '555 patent. In response, Alpex first distinguishes Mr. Lawson's work at Fairchild as not encompassing the entire Alpex invention. As for the other allegedly simultaneous inventions, Alpex notes that the earlier of these came at Atari a year after the Alpex invention, and that such a time lapse should not be considered "simultaneous" in light of the fast pace of development in the consumer electronics industry.

A reasonable jury could have concluded that Mr. Lawson's arcade game was distinguishable from the Alpex invention. Similarly, the jury could have reasonably concluded that in the context of the consumer electronics industry, inventions occurring approximately a year apart are not achieved at "about the same time." Accordingly, the court declines to find the jury's conclusion of no simultaneous invention erroneous as a matter of law. This and the other secondary considerations supported by substantial evidence will factor into the court's analysis of the question of obviousness.

**D. Obviousness.**

Assuming the jury to have made the foregoing, reasonable findings with respect to the presence of secondary considerations and the scope and relevance of the prior art, the court addresses the ultimate legal question of obviousness. To recount, first, the court finds substantial evidence supporting the jury's conclusion that the date of invention for the invention claimed in claims 12 and 13 of the Alpex patent is on or before July 21, 1974. Accordingly, the jury could have permissibly excluded the *Computer* magazine article from the prior art. Second, the court finds that a jury could reasonably find the prior art, including the *Computer* magazine article, distinguishable from the Alpex invention and less relevant than the prior art considered by the PTO. Finally, the court credits the jury's findings of commercial success, long-felt need, failure by others, copying, skepticism, and no simultaneous invention. For the reasons cited above, however, the court discounts the probative value of the jury's findings of commercial success, long-felt need, and failure by others. In light of the jury's apparent conclusions, and considering the claimed invention as a whole, I cannot conclude that Nintendo has proven the invention obvious by clear and convincing evidence. I find that the Alpex invention reflected a means for using a microprocessor, together with replaceable ROM, to create a flexible home video game system capable of displaying rotating images, a combination that was not taught by the prior art, and was met with corresponding praise and skepticism among those with skill in the art. In light of these findings, I cannot conclude that claims 12 and 13 of the '555 patent are invalid as obvious.

Nintendo's motion for judgment of invalidity as a matter of law is therefore denied.

## V. NEW TRIAL.

In addition to seeking judgment of non-infringement and invalidity as a matter of law, Nintendo moves for a new trial. "[A] district court ordinarily should not grant a new trial unless it is convinced that the jury has reached a seriously erroneous result . . . ." *Smith v. Lightning bolt Productions, Inc.*, 861 F.2d 363, 370 (2d Cir. 1988). Nintendo's motion for a new trial is largely a restatement of its arguments for judgment as a matter of law. First, Nintendo reiterates its complaints about the court's handling of the claim construction issues. Second, Nintendo revisits the jury's finding with respect to the date of invention. In conclusion, Nintendo claims that the jury reached a verdict that was against the weight of the evidence, caused by (1) the court's allegedly erroneous decision to put the question of copying to the jury; (2) Alpex counsel's allegedly prejudicial reference to the indemnification agreement between the defendants; (3) Alpex counsel's alleged manipulation of the court's *in limine* ruling on notice of the '555 patent; (4) Alpex expert Mr. Milner's alleged misconduct; (5) the court's allegedly erroneous instructions regarding Alpex's bankruptcy and pioneering patents; (6) the court's allegedly erroneous exclusion of the Channel F system; (7) the jury's allegedly arbitrary and capricious conclusion that 118 games infringe; and (1) the court's allegedly prejudicial statement to the jury at the close of the liability phase of the trial. For the reasons cited in connection with the court's consideration of the motions for judgment as a matter of law, as well as those identified below, the court does not think that the jury reached a seriously erroneous result in this case.

### A. Claim Construction.

Nintendo asserts that three aspects of the court's handling of the claim construction issue warrant a new trial. First, Nintendo claims that the court erroneously declined to instruct the jury as to the special master's construction of the video display means, thereby causing the jury to employ an incorrect construction of

the claims in its infringement analysis. Second, Nintendo argues that the court erred in neglecting to instruct the jury that its claim construction should take into consideration the way in which the hardware is interconnected and how it operates. Third, Nintendo maintains that the evolution of the special master's claim construction during the course of trial enabled Alpex to introduce legally improper and unfairly prejudicial testimony about the scope of the patent claims.

The proper division of responsibility for claim construction as between the court and the jury is not settled law, as evidenced by the current pendency of the en banc appeal in *Herbert Markman & Positek, Inc. v. Westview Instruments, Inc. and Althon Enterprises, Inc.*, No. 92-1049. It was not error for this court to give the jury its limited claim construction, leaving further refinement of that construction to the jury, subject to this court's review on a motion for judgment as a matter of law. *See Lemelson v. General Mills, Inc.*, 968 F.2d 1202, 1206 (Fed. Cir. 1992), *cert. denied*, 113 S. Ct. 976 (1993). Moreover, Nintendo was not prejudiced by the court's having left the claim construction issue to the jury in that the jury construed the claims in the manner advocated by Nintendo, *i.e.*, "a structure that includes a display RAM which has discrete storage positions which correspond to each of the bars or pixels of the TV screen." Nintendo complains, however, that in giving the jury the foregoing construction as an option on the jury verdict form, the court erroneously focused the jury's attention on a single component of the video display, rather than on the manner in which that component operated together with the other elements of the apparatus. Similarly, Nintendo claims the court failed to instruct the jury that claim construction encompassed the way in which the claimed invention operates, as well as its physical structure. Without such instructions and interrogatories, Nintendo argues, the jury's infringement analysis was erroneously conducted without any consideration of the full structure that corresponds to the means clauses in claims 12 and 13.

Nintendo's objections are unfounded. First, the allegedly misleading interrogatory employs the same language that technical

witnesses and counsel for Nintendo repeatedly used at trial to describe a "bit-map" system. (Tr. 693, 695, 1937-38, 1978-79, 3341) After nearly four weeks of trial, the jury surely recognized the structure described in the first interrogatory as that which operated in a manner labelled by Nintendo as "bitmapping." Second, the word "correspond" in the interrogatory is suggestive of the way in which the elements of the invention are connected and the way in which they operate together. The interrogatory proposed by Nintendo would have added little in this respect to that used by the court.[19] Third, contrary to Nintendo's assertions, the court's instructions specifically directed the jury to consider the way in which the patented structure works, as part of its literal infringement analysis. (Tr. 3971: 13-16) The jury is presumed to have followed these instructions, which, as noted *supra*, could have reasonably led to its findings of infringement under either section 112(6) or the doctrine of equivalents. In light of the foregoing, the court finds no basis for a new trial in its instructions or jury interrogatories relating to claim construction.

As noted above, Nintendo also complains that the evolution of the Special Master's claim construction left the court with no basis for ruling consistently on Nintendo's objections to testimony elicited by Alpex from Mr. Milner. More specifically, Nintendo claims that in light of the evolving claim construction, Alpex was erroneously permitted (1) to introduce testimony that the claims cover multiple means for performing the specified function and (2) to emphasize claim differentiation through Mr. Milner's testimony, Dr. Ward's cross-examination, and the questions and argument of counsel. Nintendo's objections to the claim

---

[19] To the court's interrogatory, asking the jury whether the patent requires "a structure that includes a display RAM which has discrete storage positions which correspond to each of the bars or pixels of the TV screen," Nintendo proposed adding "as well as the other components of Figure 2, including ROM 42A, ROM 42B, microprocessor 40, display RAM address 34, RAM write control 38 and TV interface 36." Memorandum of Law in Support of Nintendo's Motion for a New Trial, 10.

differentiation testimony are made on the basis of the decision in *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1538 (Fed. Cir. 1991), where the Court of Appeals held that "[a] means-plus-function limitation is not made open-ended by the presence of another claim specifically claiming the disclosed structure which underlies the means clause or an equivalent of that structure." Applying *Laitram*, Nintendo argues that Alpex erroneously argued that notwithstanding the fact that the only structure disclosed in the specification is a bit-map structure, claims 12 and 13 do not require a bit-map structure because claims 1 through 11 explicitly claim a bit-map structure. Nintendo overstates the holding in *Laitram*. The *Laitram* court did not rule out claim differentiation with respect to means-plus-function claims. Rather, the court held that claim differentiation is a guide, which should be used, as long as it does not run afoul of section 112(6). *Id.* Significantly, the *Laitram* court recognized that notwithstanding disclosure of only one structure in the patent specification, claim differentiation can nonetheless be helpful for identification of equivalents of that structure.[20] *Id.*; *see also D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1573 (Fed. Cir. 1985). Cast in this light, Mr. Milner's claim differentiation testimony was not legally erroneous. Moreover, to the extent that testimony and argument regarding either claim differentiation or the scope of means-plus-function claims was contrary to law, any prejudice was mitigated by instructions derived from the Federal Circuit's decisions in *Laitram and Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039 [25 USPQ2d 1451] (Fed. Cir. 1993). The court accurately explained the competing principles of claim differentiation and section 112(6) as follows:

> As I previously instructed you, in this case the court has already found that the structure corresponding to all of the

---

[20] Contrary to the patent claims at issue in Laitram, in this case, both claims being differentiated are means-plus-function claims. Nonetheless, claims 12 and 13 might be construed to cover a broader range of equivalents than claims 1 through 11, in that the latter are constrained by their narrowly specified functions.

means clauses in Claims 12 and 13 are the components set forth in figure 2 of the '555 patent, excluding the television receiver and the keyboard. As I have noted, in construing Claims 12 and 13 you may look at the other claims of the patent. The fact that more specific limitations appear in other claims may have a bearing on the proper interpretation of Claims 12 and 13. However, you may not base your construction on a difference between the claims if that construction is contrary to the construction of certain claim elements that I have given you, or if it is contrary to the requirement that means-plus-function claim elements must be construed to cover the corresponding structure in the specification or equivalents.

(Tr. 3964-65) In finding that the structure corresponding to the video display means was the structure that counsel for Nintendo had repeatedly identified as a bit-map structure, the jury clearly followed the court's instruction notwithstanding Mr. Milner's testimony to the contrary. For the foregoing reasons, Mr. Milner's testimony, like the court's handling of the claim construction, provides no basis for a new trial.

**B. Date Of Invention.**

In its motion for a new trial, Nintendo reasserts its argument that the court erred in declining to instruct the jury that the date of invention attributable to the Alpex invention was not before October 10, 1974. As discussed in connection with Nintendo's motion for judgment of invalidity as a matter of law, the court finds substantial evidence supporting an earlier invention date of July 21, 1974. Moreover, an October 10, 1974 invention date would not have materially altered the prior art evidence that was before the jury. The only evidence that fell between the two invention dates was the August 1974 *Computer* article, which, even if it were not itself prior art, could be considered by the jury as supportive of testimony about the FRED system. Moreover, consideration of that evidence is not inconsistent with the jury's validity-related findings. Accordingly, the court concludes that its

refusal to instruct the jury as to the date of invention was not error warranting a new trial.

**C. Miscellaneous Error And Misconduct.**

As a final basis for a new trial, Nintendo asserts that the verdict was reached against the weight of the evidence and as a function of a number of instances of misconduct and legal error. These incidents, standing alone or considered in their totality, provide insufficient ground for a new trial. First of all, the court notes that in three of the incidents noted by Nintendo, the court sustained Nintendo's objections and took steps to cure any prejudice. Thus, the court sustained Nintendo's objection to Alpex's reference in opening argument to the defendants' indemnification agreement, no subsequent mention was made of the agreement, and at the end of trial, the jury was instructed that the argument of counsel is not evidence. I observed the jury closely during the opening statements; in my view, counsel's passing reference to the indemnification agreement made no impression on them. Similarly, I sustained Nintendo's objection to Alpex's opening statement about the first infringement notice it sent to Nintendo. When Alpex counsel subsequently asked a related question, I sustained Nintendo's objection and gave the jury a curative instruction. Finally, upon Nintendo's objection to Mr. Milner's reference to the Special Master, I reprimanded the witness. In any event, it is my view, having watched the jury during this testimony, that his reference to the Special Master made no impact on the jury. Furthermore, contrary to Nintendo's assertion, Mr. Milner's reference to the Special Master was not the first time that Mr. Creel was identified to the jury. Indeed, Alpex counsel opened trial with a greeting to, among others, Special Master Creel, that went unobjected by Nintendo. The other conduct by Mr. Milner that Nintendo claims was objectionable does not rise to the level of warranting a new trial. His most egregious conduct was his moving about twelve feet back from the witness chair (while counsel approached the bench to discuss an objection outside the hearing of the witness and the jury), for part of which time he sat in a chair at the front end of the jury box, which chair was a few chairs away from any juror.

As startling as that was for those of us familiar with courtroom protocol, the jury seemed to me to be oblivious to it and seemed not to notice Mr. Milner's presence among them. In the course of a four-week, complicated patent trial, such fleeting and unrepeated instances of misconduct or error do not give rise to prejudice warranting a new trial.

The court takes more seriously Nintendo's claim that its decision to permit evidence and argument of copying warrants a new trial. As I noted at trial, I found the question of whether the evidence of copying should go to the jury to be an extremely close call. I have carefully considered this issue both during and after trial, and on both occasions concluded that drawing all inferences in favor of Alpex, as I must, a reasonable jury could make a finding of copying in the instant case. In light of this conclusion, I cannot conclude that allowing the evidence of copying was error warranting a new trial.

Nintendo complains next of the court's instructions regarding bankruptcy and pioneering patents. These rulings were well founded and do not provide any basis for granting a new trial. Nintendo makes the blanket assertion that "many of the Court's jury instructions were inappropriate in this case or incorrect as a matter of law." Memorandum of Law in Support of Nintendo's Motion for a New Trial, at 52. Nintendo overlooks the fact that most of the court's jury instructions were the product of negotiated agreement between the parties. Moreover, as counsel for Nintendo noted in a charge conference for the damages phase, the court sustained most of Nintendo's objections to jury instructions proposed by Alpex. *See* Transcript of Charge Conference, July 23, 1994, at 66-7. As a basis for a new trial, Nintendo now points to two instructions on which the court overruled its objections. The first of these was an instruction explaining Alpex's bankruptcy to the jury. A bankruptcy instruction was given at Nintendo's suggestion, contained in its response to Alpex's Omnibus Motion in Limine. Nonetheless, Nintendo objected to the particular instruction that the '555 patent is an asset of the bankrupt Alpex, and that the proceeds from the patent would be distributed to creditors, shareholders, and others.

Nintendo complains that the instruction gave the jury the impression that the court was administering Alpex's bankruptcy, and that proceeds of the litigation would be distributed to "needy" creditors and shareholders. I see no basis for drawing these conclusions as to the effect of the instruction. The instruction was carefully composed on the basis of proposals from both parties and I believe that it was necessary and appropriate to avoid any prejudice to Alpex as a result of its bankruptcy. The second instruction to which Nintendo objects is the court's instruction that if the jury found the '555 patent to be a pioneering patent, then it could accord the patent a broader scope of equivalents under the doctrine of equivalents. Nintendo maintains that the court's instruction was contrary to the decision in *Valmont*, 983 F.2d 1039, and other recent decisional law. Although these decisions may be read to constrain equivalence analyses under the doctrine of equivalents, they do not purport to overrule prior decisional law on pioneering patents. At Nintendo's bidding, the court fully instructed the jury as to the standard for equivalents articulated in *Valmont*. Therefore, I find no legal basis for Nintendo's objection. In the alternative, Nintendo asserts that there was no record evidence warranting the pioneering patent instruction. The evidence relating to secondary considerations, as well as Mr. Milner's explicitly stated opinion that the patent was pioneering, were sufficient basis for such an instruction. Neither this instruction, nor the bankruptcy instruction requires a new trial.

In support of its motion for a new trial, Nintendo also cites the court's pre-trial decision to preclude Nintendo from using Channel F, the commercial embodiment of the '555 patent, as a demonstrative exhibit. The court excluded the Channel F under Rule 403 of the Federal Rules of Evidence, noting the danger that the jury would mistakenly fix its attention on the Channel F, rather than the patent in suit. By permitting testimony about the Channel F but forbidding demonstration of the actual apparatus, the court struck an appropriate balance — permitting introduction of relevant evidence but limiting its presentation to avoid jury

confusion. That decision cannot be held to have produced a seriously erroneous result.

Pointing to the brevity of the jury's deliberations, Nintendo claims that its conclusions were necessarily arbitrary and capricious. Halfway through its deliberations, the jury requested a television and NES console, presumably to play the accused games. Two hours later it announced its verdict, finding that 118 of the 146 games infringed the '555 patent. Nintendo calculates that the jury had on average only 46 seconds to play and assess each game. Nintendo asserts that the jury could not have properly and diligently performed its fact-finding and deliberative function. Nintendo claims that the jurors' remarks[21] at learning that there would be a second phase of the trial indicates that they had been eager to finish the first phase of the trial, and that they had therefore rushed through their deliberations. I find no basis for Nintendo's assertions. I believe that the jurors took their responsibility seriously, as was reflected in their prompt and attentive attendance throughout trial. As is discussed in connection with Nintendo's motion for judgment of non-infringement as a matter of law, Mr. Milner's testimony regarding the presence of the ball image and linear player image in each of the games was sufficient to support the jury's finding of infringement. Nonetheless, the jury apparently tested this testimony through its own review of the accused games. In doing so, the jury evidenced diligence, not carelessness. To the extent that the jury's independent review of the games prejudiced either party, it was Alpex, because the jury concluded that fewer games infringed than Mr. Milner had indicated. Any reactions by the jurors upon learning of the second phase of the trial were natural reactions to the prospect of another two weeks of having their personal lives

---

[21] Several jurors made comments indicating a lack of enthusiasm for returning to serve during the damage phase of the trial. I note that all of the jurors appeared good-natured overall throughout both phases of the trial, and the remarks made upon hearing that their service would continue were quickly followed by a resumption of polite attention to the court.

disrupted by jury service do not infer from such comments any lack of respect for their responsibility as jurors. This conclusion is reinforced by reference to the jury's efforts in the damages phase. Most of the jurors took pains to return for service a month and a half later, willingly cancelling vacation plans and other personal commitments to do so. At the close of the damages phase, the jury deliberated for nearly two days, beginning on a Friday and returning the following Monday to complete the task. Although I believe that there may be serious questions about the advisability of trying patent cases to juries, I also believe that the jury in this case performed its duty commendably. As its final reason for granting a new trial, Nintendo cites the court's muted expression of appreciation to the jury at the close of the liability phase of the trial. Prior to excusing the jury, I stated:

> If this were the end of the case I would be coming back into the jury room to thank you for your service. I won't do that now because we are still essentially in trial. But I don't want to leave to leave you for almost a month and a half without telling you how impressed I was with you as a jury with how punctual you have been and how attentive you have been. And I want to thank you for that. All the rest of my thanks I will save for the end of the case.

(Tr. 4014) I carefully limited my comments to the jury's demeanor in court, avoiding any reference to the outcome of the trial. Contrary to Nintendo's assertions, these comments did not taint the jury for the damages phase of the trial. In sum, none of the miscellaneous "errors" or instances of misconduct, considered separately or in their totality, indicates that the liability trial of this case produced a seriously erroneous result. Accordingly, Nintendo's motion for a new trial is denied.

## DAMAGES

Having found that Nintendo infringed claims 12 and 13 of the Alpex patent, and that the patent was not invalid as obvious, the jury returned for a second phase of the trial in order to assess damages and to determine whether Nintendo's infringement had been willful. At the completion of a two-week trial on damages,

the jury arrived at a damage verdict of $208,268,418, and concluded that Nintendo of America's ("NOA") infringement had been willful, while that of its Japanese parent, Nintendo Company, Ltd. ("NCL"), had not been. Presently before the court are the parties' post-trial motions with respect to the damages phase. Nintendo moves for a remittitur, a new trial on damages, or judgment as a matter of law awarding damages in the range of $400,000 to $2,500,000. Alpex moves for entry of judgment in an amount that, in addition to the jury's $208,268,418 award, includes damages based on infringing sales conducted between December 1992 through May 1994, pre-judgment interest, and an enhancement of the award by 50%, or $104,134,209, pursuant to 35 U.S.C. § 284. For the reasons set forth below, the court denies Nintendo's motions for a remittitur, a new trial, and entry of judgment; the court grants Alpex's motion for an accounting and enhancement of the award in accordance with the accounting, the court grants Alpex's motion of pre-judgment interest providing, however for calculation of that interest as proposal by Nintendo; and the court denies Alpex's motion for a 50% enhancement of the jury's award.

## DISCUSSION

### I. REMITTITUR, NEW TRIAL, OR JUDGMENT AS A MATTER OF LAW.

Nintendo maintains that the jury's damage verdict was shockingly excessive and warrants a remittitur, new trial, or judgment as a matter of law. Nintendo asserts several bases for its post-trial attack on the damage verdict. First, Nintendo claims that Alpex ignored and/or distorted evidence probative of damages. Second, Nintendo complains that the court erred in excluding evidence of (1) Alpex licenses to third parties, (2) Alpex's initial offer to Nintendo, and (3) Alpex's statements to the bankruptcy court regarding the value of its patent. Finally, Nintendo argues that the court erroneously permitted the jury to consider the question of willful infringement. These arguments are addressed in turn below.

**A. Adequacy Of Alpex's Proof.**

"[T]he amount of a prevailing party's damages is a finding of fact on which the plaintiff bears the burden of proof by a preponderance of the evidence." *Smithkline Diagnostics, Inc. v. Helena Laboratories, Corp.*, 926 F.2d 1161, 1164 (Fed. Cir. 1991). The first prong of Nintendo's attack on the jury verdict is to find fault with the logic and legal underpinnings of Alpex's proof of damages. Under 35 U.S.C. § 284, a court may award "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty." In a case such as this, in which the patentee's lost profits cannot be calculated the damage award is based on a calculation of the "reasonable royalty," or the amount to which a willing licensor and a willing licensee would have agreed in hypothetical negotiations at the time of the first infringement. *Fromson v. Western Litho Plate and Supply Co.*, 853 F.2d 1568, 1574 (Fed. Cir. 1988). Prior to trial, the court ruled that the time period for the hypothetical negotiations would be October 1985, when Nintendo launched the NES in the New York City market. Neither party challenges that ruling post-trial.

Both during and after trial, Nintendo has urged a calculation of damages based on "real-world" facts in 1985, including the bargaining positions of both parties at the time of the hypothetical negotiations. In particular, Nintendo highlights the dismal state of the video game industry in 1985, and Alpex's licensing history, including a number of $400,000 non-exclusive license offers made in the early 1980s. Nintendo complains that Alpex improperly focussed the jury's attention on Nintendo's expectations, ignoring Alpex's bargaining position. Nintendo maintains that this flaw in Alpex's proof was exacerbated by Alpex's misuse of evidence of a licensing agreement that Nintendo had previously entered into with Magnavox. In sun, Nintendo claims that the evidence dictates a finding that the hypothetical negotiators would have agreed to a paid-up license fee ranging between $400,000 and $2,500,000; that the jury's contrary conclusion is unsupported by substantial evidence and is shockingly excessive; and that the verdict cannot stand.

In response, Alpex argues that the hypothetical negotiation analysis is a legal fiction, which, although it is a useful analytical device, should not constrain courts' efforts to do justice. Thus, Alpex emphasizes that, for purposes of the hypothetical negotiation, the patent must be presumed valid and infringed. Alpex also underscores Nintendo's actual profits as relevant to the amount required to compensate Alpex for the use made of the invention. Pointing to these profits, as well as Nintendo's expectations for the NES in 1985 and the previous license agreement between Nintendo and Magnavox, Alpex's experts testified that the hypothetical negotiators would have agreed to a 12% running royalty, yielding a damage award of $416,536,835 on Nintendo's infringing sales through November 1992. The jury's verdict split the difference between the parties' positions, awarding $208,268,418, or a 6% running royalty applied to Nintendo's infringing sales through November 1992. Although the award is less than Alpex sought, Alpex does not challenge the jury's conclusion post-trial.

The parties' positions reflect a clear conflict in their conceptions of the reasonable royalty analysis. Unfortunately, there is sufficient decisional law to give each side ground for reasonable argument. For example, Nintendo highlights the discussion of the hypothetical negotiation analysis in the oft-cited decision in *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *aff'd*, 446 F.2d 295 (2d Cir.), *cert. denied*, 404 U.S. 870 (1971). Describing the hypothetical negotiation analysis, Judge Tenney explained:

> Where a willing licensor and a willing licensee are negotiating for a royalty, the hypothetical negotiations would not occur in a vacuum of pure logic. They would involve a market place confrontation of the parties, the outcome of which would depend upon such factors as their relative bargaining strength; the anticipated amount of profits that the prospective licensor reasonably thinks he would lose as a result of licensing the patent as compared to the anticipated royalty income; the anticipated amount of net profits that the prospective licensee

> reasonably thinks he will make; the commercial past performance of the invention in terms of public acceptance and profits; the market to be tapped; and any other economic factor that normally prudent businessmen would, under similar circumstances, take into considerations in negotiating the hypothetical license.

*Id.* at 1121. In contrast, Alpex quotes decisional law suggesting a hypothetical negotiation analysis less tied to the facts known at the time the negotiations are hypothesized to have taken place. Among the authorities cited by Alpex is the Court of Appeals decision in *Fromson v. Western Litho Plate and Supply Co.*, 853 F.2d at 1574, in which Chief Judge Markey explained the hypothetical negotiation analysis as follows:

> The methodology encompasses fantasy and flexibility; fantasy because it requires a court to imagine what warring parties would have agreed to as willing negotiators; flexibility because it speaks of negotiations as of the time infringement began, yet permits and often requires a court to look to events and facts that occurred thereafter and that could not have been known to or predicted by the hypothesized negotiators.

*Id.*; *see also TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 899 (Fed. Cir. 1986) ("The willing licensee/licensor approach must be flexibly applied as a 'device in the aid of justice.'"), *cert. denied*, 479 U.S. 852 (1986); *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1158 (6th Cir. 1978) ("The setting of a reasonable royalty after infringement cannot be treated, as it was here, as the equivalent of ordinary royalty negotiations among truly 'willing' patent owners and licensees. That view would constitute a pretense that the infringement never happened. It would also make an election to infringe a handy means for competitors to impose a 'compulsory license' policy upon every patent owner").

In light of the foregoing decisional law, I cannot conclude that Alpex's proof of damages was somehow inadequate for having emphasized Nintendo's actual profits as opposed to Alpex's licensing history. In support of this conclusion, I note first that

Nintendo has failed to distinguish *Panduit*, *TWM*, and *Fromson*. Nintendo argues that in each of these cases there had been no prior license offers, so the courts were not constrained by "real world facts" like those presented here. Although true, this assertion does not counter the fact that in these cases, as well as in cases involving prior licenses, courts have distinguished the reasonable royalty resulting from a hypothetical negotiation analysis from the royalty that might have attained through actual negotiations at the time infringement began. *See e.g., Deere & Co. v. International Harvester Co.*, 710 F.2d 1551, 1557 (Fed. Cir. 1983) (district court permissibly discounted evidence of prior licenses in determining reasonable royalty). This distinction is drawn, not for want of evidence of "real world facts," but rather, to compensate the patentee adequately for the infringement. *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1081 (Fed. Cir. 1983) ("'Whether the defendant was never willing to pay a reasonable royalty is irrelevant. The willing-buyer/ willing-seller concept is employed by the court as a means of arriving at reasonable compensation and its validity does not depend on the actual willingness of the parties to the lawsuit to engage in such negotiations.'") (*quoting Tektronix v. United States*, 552 F.2d 343, 349 (Ct. Cl. 1977), *cert. denied*, 439 U.S. 1048 (1978)).

Nonetheless, as Nintendo points out, even in cases approving a flexible hypothetical negotiation analysis, courts at least anchor their analyses with facts at the time of infringement. I cannot conclude, however, that this was not what occurred here. The jury heard evidence of Alpex's license offers,. Nintendo's license agreement with Magnavox, the status of the video game industry in 1985, the success of the Japanese version of the NES, and Nintendo's expectations for the U.S. market. This evidence permitted the jury to take into account, in its hypothetical negotiation analysis, the reality in 1985. The jury was instructed that it could consider evidence of Nintendo's actual profits, but only to the extent that such evidence was probative of the expectations for the future that the hypothetical negotiators would have had as of October 1985. (Tr. 6333-34) The jury was also

properly instructed that for purposes of the hypothetical negotiation analysis, the patent is presumed to be valid and infringed. On the basis of the foregoing evidence and instructions, the jury could have reasonably determined that the hypothetical negotiators would have agreed to a 6% running royalty, or $208,268,418 of Nintendo's infringing sales from October 1985 through November 1992. To the extent that the jury gave some evidence greater weight than other evidence, and chose an award different from that advocated by either party, its analysis was indistinguishable from that approved by the Federal Circuit. *See e.g., Deere & Co.*, 710 F.2d at 1557; *Smithkline Diagnostics, Inc.*, 926 F.2d at 1168 ("the district court may reject the extreme figures proffered by the litigants as incredible and substitute an intermediate figure as a matter of its judgment from all of the evidence").

Nintendo's arguments in its post-trial motions amount to no more than a request for the court to reweigh the evidence. First, Nintendo argues that Alpex's experts ignored evidence of Alpex's expectations generally, and the Alpex license offers specifically. To the contrary, Alpex's experts testified that they considered the license offers, but that they chose to discount them as inconclusive in light of the assumption that the patent is valid and infringed. Alpex overstates its case, arguing that the assumption that the patent is valid and infringed results in an "infinite" difference between Alpex's license offers and the offers it would have made in the hypothetical negotiation. See Alpex's Memorandum in Opposition to Nintendo's Motion for a Remittitur or in the Alternative a New Trial on Damages, 17. Nonetheless, as Nintendo concedes the assumption does make a difference, and on that basis, the jury could have reasonably discounted evidence of Alpex's $400,000 offers. In arriving at a 6% running royalty, the jury could have reasonably relied more heavily on other facts, including the alternative license arrangements presented in Alpex's license offers, the Magnavox license agreement discussed below, the success of the Japanese version of the NES, Nintendo's actual profits, and the testimony of experts regarding these facts.

Nintendo objects not only to Alpex's treatment of the $400,000 license offers, but also to the emphasis that Alpex put on a license agreement that Nintendo entered into with Magnavox in the 1970s, covering Magnovox's patents on technology relating to designated arcade games with a running royalty of between 5% and 6 1/2%. The jury's verdict — which amounts to a 6% running royalty applied to Nintendo's $3,471,140,292 in infringing sales between October 1985 and November 1992 — may have been influenced by evidence of the terms Nintendo agreed to with Magnavox. Nintendo argues that any reliance on the Magnavox license agreement was misplaced. Prior to trial in denying Nintendo's motion to exclude this evidence, I concluded that it was relevant to calculation of the reasonable royalty, and more specifically to (1) the utility and advantages of the patent property over the old modes or devices, and (2) the portion of the profit or of the selling price that may be customary in the particular business to allow for the use of analogous inventions. Notwithstanding this ruling, Nintendo reasserts its objection to the Magnavox agreement as a basis for a damages calculation. First, Nintendo argues that the Magnavox license agreement was in no way comparable to the license at issue in the hypothetical negotiations. My pre-trial conclusion regarding the relevance of the Magnavox license agreement was borne out at trial by testimony identifying relevant similarities and differences between the Magnavox agreement and the agreement that results from a hypothetical negotiation analysis. To the extent that Nintendo's motion for a new trial, a remittitur, or judgment as a matter of law amounts to a renewal of its objection to admission of the Magnavox license agreement, that motion is denied. As an alternative argument, Nintendo maintains that damages should not be determined with reference to the terms of the Magnavox agreement because Nintendo would not have agreed to similar terms with Alpex, in that such terms would have put it at a disadvantage as compared to other video game manufacturers to whom Alpex had offered a $400,000 paid-up license. These considerations were presented to the jury and the jury could have reasonably relied upon the assumption that the patent is both valid and infringed, as well as evidence or the success of the Japanese

version of the NES, to conclude that for purposes of the hypothetical negotiation (1) Alpex would not have offered the $400,000 paid-up fee to Nintendo, and (2) Nintendo would have been willing to pay a 6% running royalty for the right to use the patented invention. *See Hanson*, 718 F.2d, at 1081.

Nintendo's assertions that the court's exclusion of certain evidence — Alpex's license agreements, its license offer to Nintendo, and its bankruptcy filings — gave the jury a distorted record raise separate issues addressed below. On the record before the jury, I cannot conclude that the jury's verdict, which falls in the middle of the range advocated by the two parties and is supported by substantial evidence, is unreasonable, contrary to the clear weight of the evidence, or otherwise shocking to the judicial conscience. Therefore, to the extent that Nintendo's motion for a remittitur, new trial, or judgment as a matter of law is based on assertions that the record evidence was insufficient to support the verdict, that motion must be denied.

**B. Exclusion Of Evidence: Licenses, Nintendo Offer, And Bankruptcy Court Statements.**

As an alternative line of argument in support of its motion for a remittitur, new trial, or judgment as a matter of law, Nintendo asserts that the court erred in its exclusion of evidence regarding (1) actual license agreements negotiated between Alpex and companies accused of infringing the '555 patent, and publicity materials relating to those agreements; (2) a license offer made by Alpex to Nintendo in 1985 prior to commencement of this litigation; and (3) certain statements made by Alpex in its bankruptcy court filings regarding the value of the '555 patent. Nintendo's arguments regarding these evidentiary rulings raise issues addressed on numerous previous occasions by this court. The procedural history of the court's rulings on the evidence at issue is set forth in the court's opinion and order of March 16, 1994, and on the record of a telephone conference July 15, 1994. To summarize, in an opinion and order dated July 18, 1991 ("the Rule 408 Opinion"), the court ruled that pursuant to Rule 408 of the Federal Rules of Evidence, three categories of evidence would

not be admissible at trial. *See Alpex Computer Corp. v. Nintendo Co.*, 770 F. Supp. 161 (S.D.N.Y. 1991), *reaff'd. on recons.*, 1994 U.S. Dist. LEXIS 3343 (S.D.N.Y. Mar. 16, 1994), *vacated, in part*, 1994 U.S. Dist. LEXIS 9963 (S.D.N.Y. July 19, 1994). The excluded evidence consisted of (1) documents relating to Alpex's offers to license the '555 patent to a large number of companies in the video game industry; (2) exhibits relating to licenses granted by Alpex to seven companies after extensive business negotiations, but prior to the commencement of litigation; and (3) licenses agreed to by four companies during litigation and certain documents relating to those licenses. *Alpex*, 770 F. Supp. at 162. Following issuance of the Rule 408 opinion, Nintendo moved for clarification and certification for appeal. In an order dated September 2, 1992, the Court of Appeals for the Federal Circuit declined to take the appeal, and Nintendo subsequently moved for reconsideration with respect to a subset of the excluded evidence, that is, the first category of evidence consisting of Alpex's licensing offers, plus evidence of Alpex's efforts to publicize its license agreements and Alpex's bankruptcy filings regarding the value of the '555 patent.[22] In its motion for reconsideration, Nintendo presented the evidence at issue grouped in seven categories.[23] In an opinion and order dated March 16,

---

[22] Nintendo explicitly reserved its objection to the court's initial decision regarding the other two categories of evidence, but its briefing was limited to reconsideration of the first category of evidence.

[23] The seven sets of evidence for which Nintendo sought reconsideration of the Court's Rule 408 Opinion were as follows: 1) Alpex's industry-wide license offers; 2) evidence concerning firms as to which Alpex confirmed there was no infringement; 3) evidence concerning firms which responded to Alpex's industry-wide offers stating that they were not infringing, and concerning which Alpex made no further investigation; 4) evidence concerning the offer made by Alpex to Datasoft after stating that Datasoft was not in fact infringing, including Datasoft's response to Alpex's August 22, 1983 letter; 5) evidence of standard offers made by Alpex without any claim of infringement to firms that initiated contact with Alpex; 6) evidence of Alpex's publicity materials concerning its licensing arrangements; and 7) Alpex's

1994 ("the Rule 403 Opinion"), the court concluded that although six of the seven categories of evidence could not be excluded under Rule 408, they should be excluded under Rule 403.[24] Prior to trial, Nintendo once again sought reconsideration of the court's exclusion of evidence relating to Alpex's licensing offers. Given a more complete picture of the evidence relating to damages than had previously been presented, I concluded that evidence of Alpex's licensing offers should not be excluded under Rule 403. Nonetheless, I reaffirmed my previous conclusion that publicity materials relating to Alpex's license agreements and Alpex's Bankruptcy Court statements regarding the value of the '555 patent should be excluded. Moreover, notwithstanding my decision to permit admission of evidence of Alpex's industry-wide license offers, I concluded that Alpex's 1985 license offer to Nintendo should be excluded under Rule 403. As noted above, Nintendo now objects to exclusion of the Bankruptcy Court statements, Alpex's license offer to Nintendo, the publicity materials relating to Alpex's license agreements, and the license agreements themselves. For the reasons set forth below, I conclude that the exclusion of this evidence does not warrant altering or setting aside the jury's verdict.

---

Bankruptcy Court filings describing the value of Alpex's patents.

[24] In a related opinion regarding waiver of the attorney-client privilege, the court summarized the Rule 403 Opinion as reversing the Rule 408 Opinion with respect to five of the seven categories of evidence. This statement was incorrect in part, in that in the Rule 408 Opinion the court had not explicitly addressed one of the seven categories, the Bankruptcy Court statements. To clarify, in its Rule 403 Opinion, the court held that of the six categories of evidence reconsidered, only the publicity materials should be excluded under Rule 408. The court held further that the publicity materials, the other five categories of evidence reconsidered, and the Bankruptcy Court filings should be excluded under Rule 403. As is explained below, this decision was subsequently altered prior to trial.

### 1. License agreements and publicity materials

Nintendo renews its objection to the court's exclusion pursuant to Rule 408 of Alpex's consummated license agreements with Atari, Mattel, Magnavox, Imagic, IBM, Mattel, Sierra-On-Line, and Texas Instruments. Nintendo maintains that exclusion of this evidence gave the jury a distorted view of Alpex's licensing history. More specifically, Nintendo complains that exclusion of the evidence permitted Alpex to argue that the its license with Fairchild Computer Corporation, the only admissible license agreement, was distinguishable from that at issue in the hypothetical negotiations. Similarly, Nintendo alleges that exclusion of the license agreements made it possible for Alpex's expert to suggest that there would have been no other licensees to compete with Nintendo at the time of the hypothetical negotiations.[25] Finally, Nintendo argues that it should have been permitted to introduce Alpex's license agreement with Atari, an industry leader, in order to argue that notwithstanding Nintendo's great expectations for the NES, Alpex would have offered its standard license terms to Nintendo in 1985.

Throughout this litigation, the court has been well aware of the importance of Alpex's licensing history to Nintendo's case. For this reason, the court considered these evidentiary issues on three separate occasions before trial, certified the question of Rule 408 exclusion for interlocutory appeal, and struggled to implement its rulings fairly during the trial. Notwithstanding the potential importance of this evidence to Nintendo's case, however, the court must follow the mandatory language of Rule 408, which provides in pertinent part:

> Evidence of (1) furnishing or offering or promising to furnish or (2) accepting or offering or promising to accept, a valuable consideration in compromising or attempting to compromise a

---

[25] When Nintendo raised this objection at trial, the court offered to give a curative instruction which would have eliminated any prejudice to Nintendo by explaining to the jury that Alpex had granted licenses to other companies prior to 1985. Nintendo declined the instruction.

> claim which was disputed as to either liability or amount, is not admissible to prove liability for or invalidity of the claim or its amount.

Nintendo argues that Rule 408 does not apply to Alpex's license agreements to Atari, Imagic, IBM, Mattel, Sierra-On-Line, and Texas Instruments, because, according to Nintendo, these agreements were not settlements of disputed claims, but rather, the result of business negotiations in an industry-wide licensing program. In this regard, Nintendo relies on *Big O Tire Dealers, Inc. v. Goodyear Tire & Rubber Co.*, 561 F.2d 1365 (10th Cir. 1977), in which the court concluded that communications prior to threatened litigation were not offers of compromise excludable under Rule 408. As the court noted in its Rule 408 Opinion, however, each of the license agreements at issue in this case was consummated after litigation was threatened. *See Alpex Computer Corp.*, 770 F. Supp. at 164. The court is aware, as Nintendo points out, that the threat of litigation often accompanies the negotiation of a patent license. In this case, however, I find that the threat was sufficiently well founded to bring the license agreements within the scope of Rule 408. First, prior to consummating each of the license agreements at issue, Alpex had made its threat of litigation explicit, in writing. Moreover, as evidenced by the fact that Alpex commenced several lawsuits to enforce the '555 patent, its threats were made with every intention of pursuing litigation to the extent that its resources permitted. The license agreements that Alpex negotiated to avoid that litigation were settlements of disputed claims covered by Rule 408.[26]

---

[26] Evidence of these settlement agreements is distinguishable from the evidence of Alpex's industry-wide licensing offers, which I admitted on reconsideration. Alpex made its industry-wide offers without having given prior notice of its patent or its claim of infringement, and, in many instances, without having even developed a reasonable belief that it had such a claim. Such offers, made before the parties could be said to be joined in a dispute, were nothing more than the opening gambit in business negotiations. By contrast, the license agreements that the court

Nintendo urges the court to look past the fact that the license agreements were consummated after litigation was threatened (and in some instances commenced), because, according to Nintendo, litigation was just another tool employed by Alpex in its industry-wide licensing program. Nintendo emphasizes that Alpex offered and negotiated the same license terms both before and after litigation. Nintendo argues that where terms of a license agreement negotiated in the litigation context are the same as those negotiated outside of that context, those terms should not be protected under Rule 408. The court is aware of no support for this proposition. Moreover, Nintendo's argument appears to be based on a disfavored conception of the purpose of Rule 408 as categorically excluding settlement terms because they generally present an inaccurate assessment of the validity or value of a claim and are therefore irrelevant to these issues in subsequent litigation. *See* Fed. R. Evid. 408 Notes of Advisory Committee; 2 J. Weinstein & M. Berger, *Weinstein's Evidence*, para. 408[02] at 408-17 et seq. (1986). If this were the sole purpose of Rule 408, Nintendo would have a more plausible argument: Alpex gave the same terms outside of the litigation context as it did in its settlement agreements, so, although settlement terms generally do not present an accurate or relevant measure of the value of a claim, in this case they appear to do so (if one ignores that Alpex's financial weakness left it with little appetite for pursuing litigation). Rule 408 is not primarily conceived as a "relevance" rule, however. Rather, its overriding purpose is to foster settlement of disputes by protecting as privileged statements made in the course of settlement discussions. *See* Fed. R. Evid. 408 Notes of Advisory Committee. To serve this purpose adequately, Rule 408 must be predictably applied by courts. A court cannot carve out unprecedented exceptions simply because it finds

---

excluded under Rule 408 were each consummated after infringement claims and litigation threats were made. In some instances, settlement was not reached until after litigation had actually commenced. In each case, the parties were locked in a dispute, which the agreement served to resolve.

evidence from settlement negotiations that might be particularly helpful to a party in litigation. It is precisely such admissions that Rule 408 is designed to protect when they are made in the context of dispute settlement.

Nintendo cites *Hughes Aircraft Co. v. United States*, 31 Fed. Cl. 481 (1994), in which the Court of Federal Claims found Rule 408 inapplicable to statements made in the course of settlement negotiations regarding the patentee's "normal royalty rates." The court notes that *Hughes Aircraft*, which is currently on appeal, does not bind this court. In any event, I find its analysis inapplicable to this case. The *Hughes Aircraft* case relied on exceptions to Rule 408 for statements made in the course of settlement discussions that are otherwise discoverable or offered for a purpose other than to prove the claim or its amount. To the extent that the *Hughes Aircraft* court properly applied these exceptions, its analysis does not apply here. In this case, Nintendo's motive in seeking to introduce evidence of the license agreements was to prove the amount of the claim merely because the terms of the agreements mirror terms of Alpex's industry-wide license offers, the agreement terms do not become "otherwise discoverable" for purposes of the Rule 408 exception. The exception might apply if, as in *Hughes Aircraft*. Nintendo sought to introduce a statement made by Alpex in the course of settlement negotiations regarding terms Alpex had offered in non-litigation settings. It does not apply to the actual terms of the negotiated settlement agreement, regardless of their similarity to terms negotiated or offered in non-litigation settings.

In sum, I decline to reverse my previous ruling that the consummated license agreements are inadmissible under Rule 408. These agreements are evidence relating to settlement of actual disputes. The fact that these settlements were negotiated at the same time and on terms similar to those offered by Alpex to those with whom it did not have actual disputes does not alter my conclusion. Moreover, for the reasons articulated in my March 16, 1994 Opinion and Order, I find that exclusion of the publicity materials describing the excluded license agreements is necessary to avoid undermining the effect of the Rule 408 ruling.

**2. Alpex's license offer to Nintendo**

As previously noted, in the 1991 Rule 408 Opinion, I excluded, pursuant to Rule 408, a number of industry-wide license offers made by Alpex in 1983 and 1984. In the March 16, 1994 Rule 403 Opinion, I concluded that the license offers could not be excluded under Rule 408, but that nonetheless they should be excluded under Rule 403. Subsequently, at Nintendo's bidding, I reconsidered this decision, and just prior to trial, I concluded that the evidence of the 1983 and 1984 industry-wide license offers would be admissible. In light of these reversals, Nintendo sought to introduce a similar offer made to it in January 1985, prior to commencement of this litigation. I concluded that this offer to Nintendo should be excluded. Nintendo now asserts that this ruling was made in error.

The admissibility of Alpex's license offer to Nintendo presents a close question. Upon careful consideration of the issue, I have concluded that Alpex's offer to Nintendo is distinguishable from its 1983 and 1984 industry-wide offers, and therefore should be excluded under Rule 408. First, Alpex's offer to Nintendo is distinguishable in that it specifically identifies at least one allegedly infringing game, suggesting that Alpex's infringement allegations as against Nintendo were better grounded than were those contained in its relatively vague 1983 industry-wide mailings. Second, it is uncontested that prior to receiving Alpex's license offer in January 1985, Nintendo knew of the Alpex patent. (Tr. 4583-86) By manufacturing and demonstrating its products, notwithstanding what it knew of the Alpex patent, Nintendo signalled that it disputed any claim of infringement under the Alpex patent. Nintendo complains that the foregoing facts do not meet the standard for Rule 408 exclusion articulated by the court in the March 16, 1994 Rule 403 Opinion. In that opinion, I held that Alpex could not have reasonably believed that its licensing offers were made to compromise a dispute as defined for purposes of Rule 408, until (1) it had developed well-grounded and specific claims of infringement, (2) it had communicated these claims to the alleged infringers, and (3) the alleged infringers, by words or actions, had signalled that they disputed that claim. Arguably

missing in the case of Alpex's offer to Nintendo is any evidence that Alpex had communicated its infringement claim to Nintendo and that Nintendo had contested that claim prior to Alpex having made its license offer. The test I used in considering Alpex's industry-wide license offers was not intended to be a rigid checklist, however. Rather, I found it useful in that particular context to sake the underlying determination of whether Alpex could have reasonably believed that its licensing offers were made to compromise a dispute. Given the specificity of Alpex's allegations against Nintendo in January 1985, Nintendo's prior knowledge of the patent, and its development of its product notwithstanding that knowledge, I find sufficient evidence to conclude that Alpex's January 1985 license offer to Nintendo was made to settle an actual dispute for purposes of Rule 408.[27]

**3. Bankruptcy court documents.**

Nintendo raises a final objection to the court's evidentiary rulings, pointing specifically to the court's exclusion under Rule 403 of certain statements made by Alpex in bankruptcy proceedings unrelated to this litigation. The bankruptcy court documents at issue contain statements that the '555 patent was considered to have minimal value. For example, a 1987 bankruptcy court disclosure statement cited by Nintendo describes a number of Alpex patents, including the '555 patent, as follows:

> The present fair market value and liquidation value of these patents are unknown. The Trustee has not been successful in finding any purchasers or other investors to acquire these patents. By and large, the patents appear to be obsolete and the current utility of them is very limited. It is quite possible that the patents themselves may have no actual market value.

---

[27] In reaching this conclusion, I am conscious of the fact that, unlike the industry-wide offers, this offer was made by one party to this action to the other. In such circumstances, the concerns underlying Rule 408 are particularly acute.

Appendix of Exhibits to Nintendo's Remittitur Memorandum, Ex. 34. Nintendo argues that in excluding such statements, the court eliminated the primary evidence of Alpex's expectations at the time of the hypothetical negotiations. Nintendo acknowledges, however, that the bankruptcy court statements reveal Alpex's assessment of the patent's "firesale" value in the context of a possible forced liquidation. Forced liquidation was eventually rejected in favor of a five-to-ten year liquidation plan, pursuant to which Alpex would litigate its infringement claims, rather than settle them prematurely.

As I stated on the record on February 15, 1994 and reiterated in my March 16, 1994 decision, I find the bankruptcy court documents unfairly prejudicial to Alpex and likely to cause jury confusion. First, I find the statements, which were made in an unrelated context and under different assumptions than apply in these proceedings, of little probative value. Second, it would be unfairly prejudicial to hold Alpex to its statements regarding forced liquidation, when in fact Alpex chose the alternative course of litigating infringement claims thought to be meritorious. Moreover, the statements, which were made prior to any judicial finding that the patent was valid and infringed, could have greatly confused the jury, which was correctly charged to assume that the patent was valid and infringed for purposes of its hypothetical negotiation analysis. For the foregoing reasons, I reaffirm my decision to exclude the bankruptcy court documents under Rule 403, and find no basis for a new trial, remittitur, or judgment as a matter of law in either that ruling or the other evidentiary rulings discussed *supra*.

**C. Submission Of The Willfulness Issue To The Jury.**

As a third and final basis for its motion for a new trial, remittitur, or judgment as a matter of law, Nintendo maintains that no reasonable jury could have concluded that NOA willfully infringed the patent, and that the court erred in submitting the question of willfulness to the jury. In making this motion, Nintendo renews prior motions for judgment as a matter of law made during and immediately after trial. For the same reasons

that those motions were denied, I deny the instant motion. Although as I stated at trial, the evidence regarding willfulness was not abundant, I believe that there was sufficient evidence to support a reasonable jury's finding of willfulness. In this regard, I note that willfulness is a fact-bound inquiry, requiring consideration of the totality of the circumstances. *See Studiengesellschaft Kohle, v. Dart Industries, Inc.*, 862 F.2d 1564, 1573 (Fed. Cir. 1988). Prior to the damages phase of the trial, I determined that there was insufficient evidence for the jury to conclude by clear and convincing evidence that Nintendo had copied the Alpex patent. Notwithstanding this ruling, I find sufficient evidence to support a reasonable jury's finding of willfulness. More specifically, I note testimony by Alpex expert Mr. Robert Armitage that the only written opinion of counsel predating Nintendo's decision to infringe was preliminary and could not have formed the basis of a reasonable businessman's good faith belief that the NES did not infringe. This testimony was supported by the opinion itself, as well as a contemporaneous letter by Nintendo's inside general counsel Mr. Howard Lincoln, characterizing the opinion as preliminary. There was ample room for the jury to discredit the conclusory, conflicting and unsupported testimony of Nintendo executives to the effect that they had obtained a final opinion of counsel prior to making the decision to produce the NES and that they made that decision on the basis of a good faith belief that they were not infringing. Opinions of counsel received subsequent to the decision to produce the infringing product, although relevant as part of the totality of the circumstances, do not dictate a conclusion that the infringement was not willful. *See H.B. Fuller Co. v. National Starch & Chemical Corp.*, 689 F. Supp. 923, 952-53 (D. Minn. 1988) (finding willfulness where infringer made decision to continue infringing before receiving opinion of counsel, and used opinion only to ratify its willful infringement). In sum, I find sufficient basis for a reasonable jury to find by clear and convincing evidence that NOA's infringement had been willful. My confidence in the jury's willfulness conclusion is reinforced by the fact that the jury found willfulness on the part of NOA, but not by NCL. This verdict suggests that the jury took seriously the

high quantum of proof required for this finding and that it parsed the evidence carefully. Indeed, as counsel for Nintendo argued, there was substantially less evidence from which the jury could have concluded that NCL executives (as opposed to their counterparts at NOA) lacked the requisite good faith belief that the NES would not infringe valid patent rights. Finding less conclusive evidence of NCL's intent, the jury reasonably determined that it could not conclude by clear and convincing evidence that NCL willfully infringed.

Even if the jury's willfulness conclusion were erroneous, I do not believe that presenting the jury with the issue tainted its verdict in any way. The jury was correctly instructed that its findings with respect to willfulness were not to inform its damage verdict. The jury is presumed to have followed this instruction, and Nintendo cites no basis for believing that it did not do so. As noted above, there is sufficient evidence in the record, apart from that relating to willfulness, upon which the jury could have based its calculation of damages. In sum, I sustain the jury's conclusion with respect to willfulness and find no basis for a remittitur, a new trial, or judgment as a matter of law in the fact that the question was submitted to the jury.

## II. ENHANCED DAMAGES, PRE-JUDGMENT INTEREST, AND ACCOUNTING FOR 1992-94 INFRINGING SALES.

As noted at the outset of the court's discussion of damages, Alpex moves for entry of judgment in an amount that, in addition to the jury's $208,268,418 award, includes damages based on infringing sales conducted between December 1992 through May 1994, pre-judgment interest, and an enhancement of the award by 50%, or $104,134,209, pursuant to 35 U.S.C. § 284. Each of Alpex's proposed alterations to the jury's award is discussed in turn below. For the reasons specified below, the court grants Alpex's request for an accounting for 1992-94 infringing sales, the court grants Alpex's request for an award of additional damages in the amount of 6% of the amount identified by the aforementioned accounting, the court denies Alpex's motion for

a 50% enhancement of the jury's damage award, and the court grants Alpex's motion for pre-judgment interest, such interest to be calculated as specified below.

**A. Accounting For 1992-94 Infringing Sales.**

Upon agreement of the parties, the jury verdict form directed the jury to specify the amount of damages adequate to compensate Alpex for Nintendo's infringement The verdict form did not request the jury to specify the method it employed in calculating the award. As previously noted the jury awarded $208,268,418 in damages. Alpex had sought twice this amount, or 12% of the amount stipulated to as Nintendo's infringing revenues between October 1985 and November 1992, $3,471,140,292. In the Final Joint Pre-Trial Order, Alpex stated that it would seek to recover damages for the infringing sales through November 30, 1992, and that it would seek an accounting to determine the amount of infringing sales between December 1, 1992 and the date of judgment. As part of its motion for entry of judgment, Alpex now seeks such an accounting for the period commencing December 1, 1992 through May 31, 1994, the day the patent expired. Alpex asks the court to enter judgment in an amount that includes 6% of the amount of infringing sales identified through this accounting. Failure to do so, Alpex argues, would effectively deprive it of eighteen months of its seventeen-year patent rights.

Nintendo argues that an additional award on the basis of post-November 1992 infringing sales is unwarranted. First, Nintendo asserts that there is no basis for concluding that the jury applied a 6% running royalty rate. Second, Nintendo reasserts the arguments it makes in support of a remittitur or judgment as a matter of law, claiming that the record evidence supports no verdict other than a paid-up lump sum ranging between $400,000 and $2,500,000. Neither of these arguments is well founded. Rounded to the nearest dollar, the jury's award is exactly 6% of the amount of infringing sales between October 1985 and November 1992. There is no basis in the record upon which the jury could have reached its verdict by determining that the hypothetical negotiators would have agreed to a lump-sum license

fee of $ 208,268,418. By contrast, as was discussed in connection with Nintendo's motions for a new trial, judgment as a matter of law, or a remittitur, a 6% running royalty is supported by substantial evidence, including the Nintendo-Magnavox license agreement. Accordingly, I find that the jury verdict reflects the jury's determination that the hypothetical negotiators would have agreed to a 6% running royalty. *See Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.*, 750 F.3d 1552, 1558 (Fed. Cir. 1984) (jury is assumed to have made findings necessary to support its verdict). The jury calculated its award by multiplying the running royalty by the infringing revenues figure, arbitrarily determined as of November 30, 1992, the date of the most recent data available to Alpex. Complete compensation of Alpex requires that the 6% royalty rate be applied to infringing sales through the date the patent expired, May 31, 1994.[28] Accordingly, Nintendo is directed to submit, within 21 days of the date hereof, an affidavit from an officer of Nintendo of America setting forth the sales figures for the period December 1, 1992 through May 31, 1994 for all products which the parties have agreed are included within the revenue base at issue in the damages phase of this case.

**B. Enhanced Damages.**

Under 35 U.S.C. § 284, "the court may increase the damages up to three times the amount found or assessed." No statutory standard governs such enhancement. It is generally committed to the sound discretion of the court, most often triggered by a finding that the infringement was wanton or willful, although such a finding does not mandate that damages be enhanced. *See Read Corp. v. Portec, Inc.*, 970 F.2d 816, 826 (Fed. Cir. 1992). Enhancement must turn on consideration of all of the factors relevant to the egregiousness of the defendant's conduct. Id.

---

[28] In its complaint, Alpex sought injunctive relief as well as damages. The jury's verdict in the liability phase of the trial was not handed down until after the patent expired, however. Although delay in trial of the case rendered Alpex's request for injunctive relief moot, it is entitled to damages for infringement to the expiration date of the patent.

Among factors that courts have considered relevant to this inquiry are (1) whether the infringer deliberately copied the invention; (2) whether the infringer investigated the patent and developed a good faith belief that it was not valid or infringed; (3) the infringer's behavior as a party to the litigation; (4) the defendant's size and financial condition; (5) the closeness of the case; (6) the duration of the defendant's misconduct; (7) any remedial action taken by the defendant; (8) the defendant's motivation for harm; and (9) whether the defendant attempted to conceal its misconduct. *Id.*, at 827. In support of its request for a 50% enhancement of the jury's award, Alpex cites (1) the jury's conclusion that NOA's infringement was willful, (2) Nintendo's conduct in the litigation, (3) Nintendo's size and financial condition, (4) the duration of Nintendo's conduct, (5) remedial action by Nintendo, and (6) Nintendo's motivation for harm. As set forth below, these factors provide insufficient basis for enhancement of damages in this case.

First, I have carefully reviewed the jury's finding of willful infringement. Although I find sufficient evidence to conclude that the jury reasonably reached this conclusion, I remain of the view that this is a close case, both as to willfulness and the underlying questions of infringement and validity. I as respectful of the jury's apparent assessment of the credibility of NOA executives, but I am also mindful that the willfulness evidence contains no "smoking gun." There is insufficient evidence to support a finding by clear and convincing evidence that Nintendo copied the patent; and there is no conclusive documentary evidence that Nintendo purposefully determined to engage in infringing activities. The case raises several difficult questions relating to claim construction and infringement under section 112(6) and the doctrine of equivalents. Both the court and the special master struggled mightily with these issues, which have been the subject of evolving legal doctrine during the eight-year pendency of this litigation and remain uncertain in light of pending *en banc* appeals. In this factual and legal context, I cannot conclude that this case presents the same kind of egregious conduct that other courts have concluded called for enhanced damages.

For substantially the same reasons, I find that both the duration of Nintendo's infringement and its aggressive pursuit of its rights in this litigation were warranted. Alpex specifically complains that Nintendo delayed trial of the case until expiration of the patent in order to avoid an injunction pursuant to 35 U.S.C. § 283. Although a number of motions filed by Nintendo did have the effect of postponing trial, the delay was primarily attributable to the complexity of the case and the fact that the court's docket has been inordinately crowded in recent years due to a large number of judicial vacancies in this district. Alpex also complains that a number of last-minute changes in Nintendo's trial strategy forced it to conduct numerous depositions just prior to and during trial, at great expense and inconvenience. I did permit Nintendo to make a number of significant alterations in its trial strategy both prior to and during trial. I permitted this modification in trial strategy in order to obtain a full and fair trial of the issues in the case. In each instance, a condition of granting Nintendo's request was that Alpex would be afforded whatever discovery or procedure was necessary to avoid prejudicing its interests. Although these procedures may have resulted in some inconvenience for Alpex, the outcome of the trial assures me that Alpex's interests were not compromised. I am confident that Alpex suffered no undue hardship during trial and see no reason to enhance the damage award due to the stress and strain that normally and justifiably accompanies high-stakes litigation. In sum, I cannot conclude that there is a sufficient basis for enhancement in the evidence of willfulness or any of the other relevant factors. Alpex's motion for a 50% enhancement of the damage award is therefore denied.

**C. Prejudgment Interest.**

In addition to the 50% enhancement discussed above, Alpex moves for prejudgment interest on the damages awarded by the jury and those determined through an accounting. Nintendo objects both to any award of pre-judgment interest, and to the method of calculating such interest proposed by Alpex. For the reasons set forth below, the court grants Alpex's motion for

pre-judgment interest. Such interest shall be calculated as specified below.

The statute governing patent damages provides that a district court shall award damages to compensate for the infringement, "together with interest and costs as fixed by the court." 35 U.S.C. § 284. The Supreme Court has interpreted this provision as follows:

> The standard governing the award of prejudgment interest under section 284 should be consistent with Congress' overriding purpose of affording patent owners complete compensation. In light of that purpose, we conclude that prejudgment interest should ordinarily be awarded. In the typical case an award of prejudgment interest is necessary to ensure that the patent owner is placed in as good a position as he would have been in had the infringer entered into a reasonable royalty agreement. An award of interest from the time that the royalty payments would have been received merely serves to make the patent owner whole, since his damages consist not only of the value of the royalty payments but also of the foregone use of the money between the time of infringement and the date of the judgment.

*General Motors Corp. v. Devex Corp.*, 461 U.S. 648 (1983). The court noted, however, that section 284 does not require an award of prejudgment interest. Such interest may be limited or denied under certain circumstances, where, for example, the patentee is responsible for undue delay in litigating the case. *Id.* at 657-58.

Applying the foregoing standard, I find that prejudgment interest is warranted in the instant case. In opposition, Nintendo claims that unlike the usual case, prejudgment interest is not necessary in this case due to the size of the jury's award. Nintendo argues that the jury's award alone is sufficient to place Alpex in as good a position as it negotiated a reasonable royalty with Nintendo prior to the infringement. This argument is nothing more than a reiteration of its argument in support of a remittitur, new trial, or judgment as a matter of law. At its foundation is Nintendo's continual assertion that the reasonable royalty Alpex

would have negotiated in 1985 was a $400,000 lump-sum payment. Nintendo argues that "the jury's punitive award of over $ 208 million places Alpex in a position vastly *superior* to the position Alpex would have been in if Nintendo had entered into a license agreement rather than exercise its right to challenge the patent." Nintendo's Mem. in Opposition to Alpex's Motion for Entry of Judgment, 23. The jury was instructed that it was to determine damages as the amount adequate to compensate Alpex, and that it was not to award damages to punish Nintendo. The jury is presumed to have followed those instructions. Moreover, as noted *supra*, a reasonable jury could have concluded that the reasonable royalty or amount to compensate Alpex is a 6% running royalty, setting compensatory damages at $208,268,418. I find that the jury's award in this case was limited to compensatory damages. In light of these findings, prejudgment interest on the jury's award is appropriate. *Cf. Beatrice Foods, Co. v. New England Printing & Lithographing Co.*, 923 F.2d 1576, 1580-81 (Fed. Cir. 1991) (prejudgment interest say be based only on the compensatory portion of the damages award, not on the punitive, enhanced portion of the award).

There remains the contentious question of how prejudgment interest should be calculated. The parties disagree over (1) which interest rate should be used; (3) whether interest should be calculated on a pre-tax or post-tax basis; and (3) what is the timing of the royalty payments on the basis of which the interest should be calculated. The court addresses each of this issues below, concluding that interest should be calculated on year-end royalty payments, and on an after-tax basis, using the commercial paper rate, as proposed by Nintendo.

With respect to the appropriate interest rate, Alpex advocates the prime rate plus 1%, while Nintendo promotes either the Treasury Bill rate or the defendant's borrowing rate, which it maintains is the commercial paper rate. The interest rate at which prejudgment interest is calculated is within the sound discretion of the district court. *See Bio-Rad Laboratories, Inc. v. Nicolet Instrument Corp.*, 807 F.2d 964, 969 (Fed. Cir. 1986), *cert. denied*, 482 U.S. 915 (1987). Sitting by designation in the

Northern District of Illinois, Court of Appeals Judge Easterbrook has recently held that prejudgment interest should be analyzed as if the patentee had lent funds to the infringer during the pendency of the litigation. *See e.g, In re Mahurkar Double Lumen Hemodialysis Catheter Patent Litigation*, 831 F. Supp. 1354, 1394-95 (N.D.Ill. 1993). Judge Easterbrook recommends calculating prejudgment interest at a rate that is adequate to compensate the patentee for the risk he incurs in giving the infringer a "large, involuntary, unsecured loan to a debtor of uncertain creditworthiness that is doing its utmost to avoid paying." *Id.* at 1394. I find this analysis persuasive, particularly where, as here, there is no evidence relating to the use to which the patentee would have put the royalty payments. Accordingly, I have decided to follow Judge Easterbrook's recommendation. Nonetheless, I do so cautiously for two reasons. First, pinning the interest rate to the level of risk the patentee faces in litigation could result in infringers paying more in prejudgment interest, the better their case for non-infringement. Penalizing infringers for mounting aggressive defenses in close cases does not serve the interests of patent law. Even more troubling is the fact that Judge Easterbrook's analysis of the appropriate interest rate could risk duplicating courts' analyses of willfulness and punitive enhancement of damages. This potential for duplication is reflected in Alpex's argument that the protracted and comprehensive nature of the litigation justifies calculation of prejudgment interest at the prime rate plus 1%. Such reference to the length of the litigation, and inevitably to the parties' conduct in litigation, risks impermissibly turning the interest calculation into a punitive, as opposed to a compensatory, measure.[29]

---

[29] *See Beatrice Foods Co.*, 923 F.2d at 1580 ("prejudgment interest is designed 'to compensate for the delay a patentee experiences in obtaining money he would have received sooner if no infringement occurred,' while 'on the other hand damages are trebled as punishment.'") (*quoting Paper Converting Machine Co. v. Magna-Graphics Corp.*, 745 F.2d 11, 23 (Fed. Cir. 1984)); *Bio-Rad Laboratories*, 807 F.2d at 967-68 (district court's exercise of discretion in calculating prejudgment interest "must be guided by the purpose of prejudgment interest, which is to ensure that

Notwithstanding his discussion of the substantial risk associated with a patentee's loan to an infringer, Judge Easterbrook advises calculating interest at the market rate the infringer generally pays for money, perhaps in implicit recognition of the foregoing considerations. *In re Mahurkar*, 831 F. Supp. at 1395. Similarly here, I have concluded that prejudgment interest should be calculated on the basis of Nintendo's borrowing rate. I find persuasive the uncontested testimony of Nintendo's expert, Mr. Robert Sherman, to the effect that the appropriate measure of Nintendo's borrowing rate is the commercial paper rate. I conclude, therefore, that the commercial paper rate should serve as the rate for calculation of prejudgment interest in this case.[30]

---

the patent owner is placed in as good a position as he would have been had the infringer entered into a reasonable royalty agreement."); *In re Mahurkar*, 831 F. Supp. at 1394 ("Interest is not a 'penalty' of any kind; it simply represents the time value of money and is an element of complete compensation, putting the victim in the position it would have occupied had there been no wrong.").

[30] In reaching this conclusion, I have also considered the question in terms of what Alpex would have done with royalty payments from Nintendo over the past eight years. In this regard, I find too speculative the testimony of Alpex expert Mr. Stephen Willis, (1) that Alpex would have either (a) emerged from bankruptcy and engaged in riskier investments similar to its historic investments, or (b) invested the royalty payments in intermediate government bonds; and (2) that a pre-tax rate of the prime rate plus 1% is an accurate proxy for the after-tax return Alpex would have made in either case. In the absence of any concrete evidence of Alpex's investment opportunities, I believe that the commercial paper rate provides a fair measure, not only of Nintendo's borrowing rate, but also of Alpex's lost investment opportunities over the course of this litigation. Indeed, it provides a better return than the Treasury Bill rate, a rate that courts often employ, and that fairly reflects the type of low-risk investment that Alpex's bankruptcy trustee would likely have made.

The parties next debate whether prejudgment interest should be calculated on an after-tax or pre-tax basis. Alpex proposes calculating prejudgment interest on a pre-tax basis, arguing that a pre-tax rate of the prime rate plus 1% is an accurate proxy for the after-tax return Alpex would have made on its investments of the royalty payments. Alpex provides no other argument in support of calculating interest on an after-tax basis, arguing merely that such calculation is its prerogative. As Alpex's expert testified, however, as a matter of "pure economics," prejudgment interest should be calculated on an after-tax basis. Because Alpex would have had to pay taxes on any profits it earned, it lost the time-value of money on only the after-tax amounts of unpaid royalty payments. Courts' refusal to calculate prejudgment interest on an after-tax basis in other cases is typically a function of technical difficulties relating to after-tax calculation that are not as troublesome here. *See e.g., Polaroid Corp. v. Eastman Kodak Co.*, 16 U.S.P.Q.2d 1481, 1540 (D. Mass. 1990). Although Alpex complains that determination of Alpex's effective tax rate is difficult, it identifies no errors in Mr. Sherman's after-tax calculation of prejudgment interest. I find that Mr. Sherman's after-tax calculation presents the economically most accurate measure of prejudgment interest due to Alpex. Noting no legal impediment to that conclusion, I will adopt his analysis as authoritative in this case.

The parties' final difference over prejudgment interest relates to the assumed timing of royalty payments. Nintendo's Mr. Sherman maintains that the royalty payments should be assumed to be paid at the end of each year in which the underlying revenues were made. Alpex's Mr. Willis advocates a mid-year payment assumption, effectively assuming that six-month's worth of royalties are paid after they are earned, and six-month's worth of royalties are paid before they are earned. Nintendo complains that Mr. Willis' analysis is the equivalent of assuming royalty payments were made on a daily basis, and that his method artificially inflates prejudgment interest by $15,000,000. Alpex responds that its calculation conservatively estimates a quarterly royalty payment schedule, and that such a schedule is reasonable

in light of the fact that Nintendo's own license agreements generally specified such payments. To make its point, Alpex compares the prejudgment interest resulting from its mid-year calculation with higher figures allegedly resulting from a quarterly payment assumption. Unfortunately, as Nintendo points out, Alpex's comparison is misleading because it fails to keep the effective annual rates constant for purposes of both the mid-year calculation and the quarterly calculation. Therefore, I cannot conclude that Alpex's mid-year convention accurately approximates a quarterly payment schedule. I believe that it is fully within my discretion to accept the more straightforward, year-end calculation proposed by Nintendo.

To summarize, I find that an award of prejudgment interest is warranted. Such interest shall be calculated on an after-tax, year-end basis at the commercial paper rate. According to the testimony of Mr. Sherwin, which I accept as authoritative, prejudgment interest on the jury's verdict through August 1, 1994 is $55,604,579. Interest on the jury's verdict from August 1, 1994 to the date of judgment is accruing at a daily rate of $31,685. In addition, Alpex is entitled to interest on the 6% royalties payable on Nintendo's infringing revenues between December 1, 1992 and May 31, 1994. Within 21 days of the date hereof, Nintendo shall submit a supplemental affidavit by Mr. Sherman, or such other qualified expert, specifying prejudgment interest (calculated in accordance with the ruling herein) on royalties payable on its infringing revenues between December 1992 and May 1994.

## CONCLUSION

For the reasons set forth above, the court denies Nintendo's motions for judgment of non-infringement and judgment of invalidity as a matter of law; the court denies Nintendo's motion for a new trial on liability; and the court also denies Nintendo's motion for a remittitur, new trial, or judgment as a matter of law with respect to damages. Alpex's motion for entry of judgment is granted in part and denied in part. Specifically, the court grants Alpex's motion for an accounting with respect to Nintendo's

infringing revenues between December 1, 1992 and May 31, 1994. Judgment shall be entered in an amount that, in addition to the jury's award, includes 6% of Nintendo's infringing revenues during the period between December 1, 1992 and May 31, 1994. The court also grants Alpex's motion for prejudgment interest, directing that such interest be calculated on year-end royalty payments, and on an after-tax basis, using the commercial paper rate, as proposed by Nintendo. Alpex shall also be entitled to prejudgment interest on the 6% of Nintendo's infringing revenues between December 1, 1992 and May 31, 1994, to be determined through the aforementioned accounting. Finally, the court denies Alpex's motion for a 50% enhancement of the jury's verdict. Within 21 days of the date hereof, Nintendo shall submit (1) an accounting of its infringing revenues between December 1, 1992 and May 31, 1994, and (2) a supplemental affidavit specifying the prejudgment interest on the 6% royalty payments due on these additional revenues. Within one week of Nintendo's submission, the parties shall submit a joint proposed judgment in accordance with the court's rulings herein. In the event that the parties fail to agree upon a joint proposed judgment, they shall each submit a proposed judgment for the court's consideration.

SO ORDERED.

DATED: New York, New York
December 2, 1994

/s/Kimba M. Wood
Kimba M. Wood
United States District Judge

## APPENDIX A

**UNITED STATES DISTRICT COURT**
**SOUTHERN DISTRICT OF NEW YORK**

**ALPEX COMPUTER CORPORATION,**
**Plaintiff,**

**-against-**

**NINTENDO COMPANY LIMITED and**
**NINTENDO CORPORATION OF AMERICA,**
**Defendants.**

**86 Civ. 1749 (KMW)**

## REPORT OF SPECIAL MASTER ON CLAIM CONSTRUCTION OF CLAIMS 12 AND 13 OF UNITED STATES LETTERS PATENT NO. 4,026,555

This is the report of Special Master Thomas L. Creel on reconsideration of the claim construction of claims 12 and 13 of United States Letters Patent No. 4,026,555 ("'555 patent'). An evidentiary hearing was held on the construction of these claims on May 2, 1994. The hearing was to allow the parties to present testimony for reconsideration of the claim construction which was set forth in the Opinion and Order of the court dated January 18, 1991. That opinion construed claims 12 and 13 (plus others) of the '555 patent on cross motions of summary judgment of Alpex and Nintendo.

This report is not a report under Fed.R.Civ.P. 53(e)(3).

### PROCEDURAL BACKGROUND

The Court's Opinion and Order of January 18, 1991 (hereafter "1991 Opinion and Order") ruled on two motions for summary

judgment. One was brought by Nintendo seeking a judgment of invalidity of claims 12, 13, 14 and 17 of the 4,026,555 patent as anticipated under 35 U.S.C. § 102 and as obvious under 35 U.S.C. § 103. Plaintiff, Alpex cross-moved for summary judgment seeking a ruling that the claims at issue were valid. The Court denied both motions. In so doing, the Court construed the claims then at issue.

Since that opinion and order, there has been extensive briefing over many years with regard to the claim construction in that Opinion and Order. Nintendo strongly urged the construction was in error, while Alpex raised no dispute with the construction.

On January 30, 1991 Nintendo filed a motion for clarification of the Opinion and Order. While that motion was still pending, Nintendo filed a motion for certification to appeal the claim interpretation to the Court of Appeals for the Federal Circuit. On December 4, 1991 the District Court entered an Opinion and Order denying the motion for clarification and certifying for appeal two questions relating to claim interpretation. The Court noted possible error in its claim interpretation and indicated that closer to the time of trial it might engage in limited reconsideration of the opinion. In an order dated September 2, 1992 the Federal Circuit declined to take the appeal. Shortly thereafter Nintendo sought leave to file a motion seeking reconsideration of the opinion and order. Alpex has opposed Nintendo's efforts to relitigate the claim interpretation. In connection with this hearing the Court sought the views of the parties with regard to whether that claim construction in the 1991 Opinion and Order should be revisited before trial at all and if so, what claim construction matters were still at issue Nintendo urged such a hearing be held, citing that unless the claim construction which it believed to be in error was corrected prior to trial, its experts would have to give alternative opinions concerning how to construe these claims at trial. It stated it did not want to go into trial with the opinion as it now stands. (April 13, 1994 Tr. pp. 49-50) Alpex, on the other hand, urged the Court to defer any change in the ruling, if it occurred at all, since the Court would have an opportunity to change the claim construction after hearing

evidence at the trial but before the jury is instructed as to what the claims mean. (*Ibid.*, Tr. p. 48)

Thomas L. Creel was appointed as Special Master and was assigned the task of presiding over a claim interpretation [*184] evidentiary hearing. This report is the result of that hearing, held on May 2, 1994, from 10 a.m. to 7 p.m.

At the May 2 hearing Dr. Stephen A. Ward and Mr. Stephen Bristow testified for Nintendo, and Mr. Ronald E. Milner testified for Alpex. Several exhibits were received.

## THE CLAIM CONSTRUCTION ISSUES

As a result of agreements between the parties, the contested areas of claim construction have been greatly reduced from the original motions for reconsideration. Alpex has dropped infringement claims on claims 14 and 17. Therefore, only claims 12 and 13 are now at issue. The parties are now largely in agreement that the claim structure in the 1991 Opinion and Order is correct, except for the issue raised at the May 2 hearing.

Claims 12 and 13 of the '555 patent are as follows:

"12. Apparatus for playing games by displaying and manipulating player and ball image devices on the screen of a display tube, comprising

first means for generating a video signal representing a linear player image device aligned in a first direction,

second means for generating video signal representing a ball image device

manually operable game control means, and

means responsive to said manually operable game control means for causing said first means to generate a video signal representing the player image device rotated so that it is aligned in a second direction different from said first direction.

13. Apparatus according to claims 12, wherein said means for causing includes programmed microprocessor means, and a replaceable memory having program game instructions stored

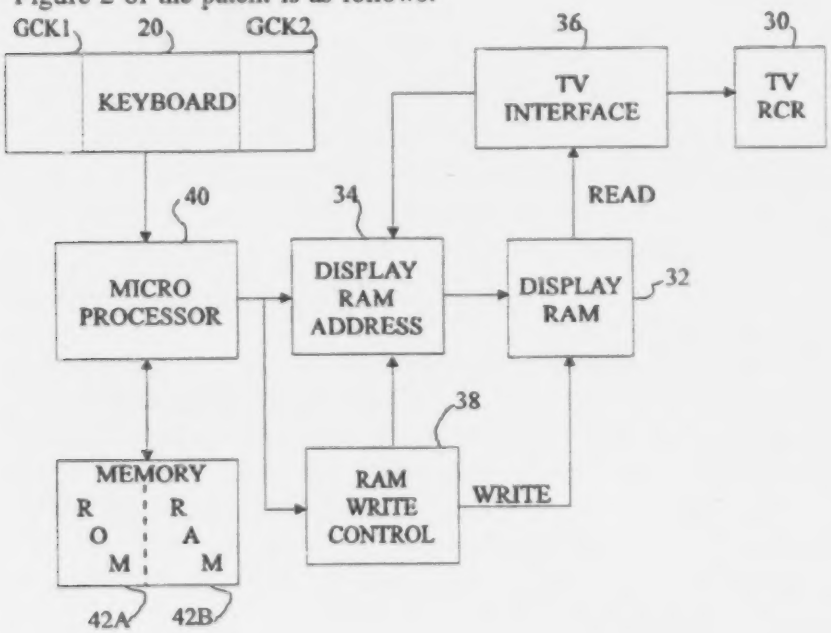
therein for controlling said microprocessor means, whereby different games may be played with said apparatus by replacing said replaceable memory."

The only remaining issues relate to the memory structure of claims 12 and 13. As to the memory, the following construction in the 1991 Opinion and Order is in issue for both claims:

> Given the requirements of § 112(6) that in construing a means-plus-function claims a court must construe the claim to cover the corresponding structure described in the specification, this court concludes that the "first means" [of Claim 12] includes all of the components illustrated in Figure 2 of the patent, other than the keyboard and the television receiver.[1]
>
> The nest limitation describes a "second means for generating a video signal representing a ball image device." Col. 20, lines 13-14. The structure corresponding to this means is identical to that of the first means. The only

---

[1] Figure 2 of the patent is as follows:



difference lies in the function: the means simply generate different images — the first a player image device, and the second, a ball image device. (p. 8)

* * * *

The structure corresponding to the last means is identical to that of the first and second means, namely that shown in Figure 2 except for the receiver and the keyboard. The only difference between this means and the first means again lies in the function. This means allows the system user to operate the keyboard (or its equivalent) in such a way as to rotate the player image. (pp. 8-9)

* * * *

Alpex argues that this court should read Claim 12 as including a requirement that "the ROM which stores the game instructions must be contained in a modular unit which can be easily plugged into or removed from the machine by an adult or child to permit an unlimited variety of different games to be played. (p. 10)

* * * *

While we hold that the claim includes the requirement of modular plug-in units, there is no basis for Alpex's assertion that such modular units *must* be of the type "which can be easily plugged into or removed from the machine by an adult or child. (p. 11)

As to Claim 13, the underlined construction below is at issue:

Claim 13 is dependent on Claim 12, and therefore includes all of the limitations of Claim 12 in addition to the limitations added by Claim 13. Claim 13 is similar to Claim 12, but is narrower because it eliminates the possibility of certain equivalent structures being substituted for the means used in Claim 12. Claim 13 specifically requires that the "means for causing" in Claim 12 is confined to a programmed

> microprocessor *and a replaceable memory of the type described above;* one without the owner will not suffice. (p. 12)

The parties have agreed with the claim construction set forth in the 1991 Opinion and Order, except for the three items below which Nintendo has asked the Court to reconsider. *See, e.g.*, letter of April 18, 1994 from Nintendo's counsel to the Court:

> "the Court correctly found that the structure corresponding to the first two means claims of claim 12 included 'all of the components illustrated in Figure 2 of the patent, other than the keyboard and the television receiver.' The Court further found that figure 2 shows the components of the claimed invention as a microprocessor and two types of memory, ROM 42A and RAM 42D. The ROM unit contains the game instructions.' Opinion at 7-8. The Court concluded that claim 12 should be construed to require a microprocessor and equivalents. Nintendo agrees with this conclusion."

*See also* the statement by Nintendo's counsel at page 52 of the April 13, 1994 transcript: "we agree with the claim construction you have in the original opinion."

The only construction Nintendo now urges should be changed is to the following:

1. Claim 12 is construed to require on-board ROM: whether with or without additional replaceable ROM, plus equivalents.

2. Claim 13 is construed to require on-board ROM (and equivalents) together with a program microprocessor and additional replaceable memory.

3. The terms "replaceable memory" in Claim 13 is construed to mean memory that is replaceable, whether or not in the

form of a modular plug-in unit, plus equivalents.[2] (April 18, 1994 letter)

Subsumed within these three questions are the issues whether Claims 12 and 13 were properly construed in the 1991 Opinion and Order insofar as they were construed to require replaceable memory and/or replaceable memory which is in the form of modular plug-in units.

## THE LAW AS TO CLAIM CONSTRUCTION

It is clear that claim interpretation is a question of law. *McGill Inc. v. John Zink Co.*, 736 F.2d 666, 671 (Fed. Cir.), *cert. denied*, 469 U.S. 1037 (1984). Nevertheless, the following procedure should be used:

> "If the language of the claim is undisputed, the District Court could interpret or construe the claims as a matter of law. [Citations omitted] If, however, the meaning of a term of art in the claims is disputed and extrinsic evidence is needed to explain the meaning, construction of the claims could be left to the jury. *Id.* at 671-72."

Accord, *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 974 (Fed. Cir. 1985).

The claims should be construed as they would be to one of ordinary skill in the art. *Fromson v. Advance Offset Plate, Inc.*, 720 F.2d 1565, 1571 (Fed. Cir. 1983). The relevant time period is the application's filing date, here March 12, 1975. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1556 (Fed Cir. 1983); *Barnett v. United States*, 6 Cl. Ct. 631, 673 (Ct. Cl.

---

[2] It is unclear whether Nintendo also seeks a further construction of the "display RAM 32". Its letter of April 18, 1994 says that the Court properly included this element in its claim construction. It also states, however, that display RAM 32 is limited to a bit mapped display. The Court on April 28, 1994 reserved this possible question of claim interpretation to trial. It was not the subject of testimony at the May 2 hearing.

1984). This date has been agreed by counsel to be pertinent date. (See Special Master's letter to counsel of April 29, 1994, p. 2) Furthermore, a claim should be construed so as to avoid, if possible, reading into it the limitations of other claims. *Autogiro Co. of America v. United States*, 181 Ct. Cl. 55, 384 F.2d 391, 404 (Ct. Cl. 1967). Finally, where possible, they should be construed so as to avoid a finding of invalidity.

Many Of the limitations in Claims 12 and 13 are expressed in the form of means-plus-function. The patent statute mandates how such limitations are to be interpreted:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. 35 U.S.C. § 112 (¶ 6)

"In construing a 'means plus function' claim, as also other types of claims, a number of factors may be considered, including the language of the claim, the patent specification, the prosecution history or the patent, other claims in the patent, and expert testimony." *Palumbo v. Don-Joy, Co.*, 762 F.2d at 974-75.

Thus the role of the court and the jury seem well defined; that is that the court construes the claims according to what they mean to a person of skill in the art, with the help of expert testimony if needed; except when there is an ambiguous term, at which point that is a question of fact for the jury.

To make this distinction, however, is exceedingly difficult in practice. There are a multiplicity of cases where the Federal Circuit as well as the district courts have wrestled with when courts should construe claims without the aid of a jury and when there are factual issues for the jury. *See, e.g., Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1387 (Fed. Cir. 1992) ("Claim interpretation is a question of law amenable to summary judgment, . . . and disagreement over the meaning of a term within a claim does not necessarily create a genuine issue of

material fact." (emphasis added)); *Tillotson, Limited v. Walbro Corp.*, 831 F.2d 1033 (Fed. Cir. 1987) ("Claim scope or construction is a question of law and the essence of a dispute as to that legal issue does not preclude summary judgment. . . . When a claim is in dispute, however, it is necessary to look at certain extrinsic evidence, including the specification, the prosecution history and other claims. . . . Underlying factual issues *may* thus arise pertaining to this extrinsic evidence which precludes summary judgment." (emphasis added)). *See also C.B. Bard, Inc. v. Advanced Cardiovascular Systems, Inc.*, 911 F.2d 670, 673 (Fed. Cir. 1990), which held:

> "Claim interpretation, which is a question of law, involves examination of the claim at issue, the specification, and the prosecution history. . . . Claim interpretation may depend upon conflicting evidentiary material which can give rise to a genuine factual dispute. Resolution of any such factual dispute is required for proper claim interpretation."

Possibly because of this difficult line-drawing, many district courts have not construed the claims for the jury, but rather have submitted this issue to the jury, together with proper instructions to consider and decide the factual questions necessary to construe the scope of the claims, as well as instructions as to the law of claim construction. Then the court has reviewed claim construction on a motion for JNOV. *See, e.g., Lemelson v. General Mills, Inc.*, 968 F.2d 1202 (Fed. Cir. 1992); *Tol-O-Matic, Inc. v. Produkt-und Mktg. Gesellschaft m.b.H.*, 945 F.2d 1546, 1550 (Fed. Cir. 1991) ("As did the district court in the case at bar . . . it is proper to instruct the jury as to the principles of law to be applied, to guide the jury in its application of the law to the facts."); and *Senmed, Inc. v. Richard-Allan Medical Industries, Inc.*, 888 F.2d 815, 817 (Fed. Cir. 1989), where the Federal Circuit hold:

> "Construction of claim scope (claim interpretation) . . . is a question of law for decision by the trial judge on motion for JNOV and by this court on appeals."

* * * *

"That a jury has answered a legal question may not in itself require reversal. . . . However, that circumstance cannot serve to relieve the trial judge or this court of the judicial duty to insure that the law is correctly applied."

*See also* [NEWMAN, dissenting] at 812:

"It was not error to charge the jury with determining the meaning of words in the claims as a first step in its determination of whether the claims were infringed. The jury's authority to decide questions of law as part of its fact-finding responsibility was affirmed early in the nation's history."

Indeed, the matter of the role of the court and jury in claim construction has become so unsettled that the Court of Appeals for the Federal Circuit has taken this issue en banc for resolution. *See Markman and Plastic v. Westview Instruments, Inc. and Althon Enterprises, Inc.*, No. 92-1046, in the Court of Appeals for the Federal Circuit. There, the Court asked for briefing on four specific questions, of which the following are of particular interest:

"Question 1

Are disputes over the meaning of a term in a claim (a) issues of law to be decided on a documentary record similar to questions of statutory construction, or (b) are there some claim construction disputes that can only be resolved by resort to extrinsic evidence which requires the taking of factual and expert testimony?

"Question 2

If factual or expert testimony is proffered to resolve a particular dispute, what are the respective roles in the trial judge and jury?

"Question 4

When the meaning of a claim term must be decided in the course of deciding the question of infringement, what are the respective roles of trial judge and jury?"

In the *Markman* case, the district court judge gave the issue of claim construction to the jury with the following instruction:

> "determine the meaning of the claims taking the interpretation as I've explained it [sic] to you using the relevant patent documents including the specifications, the drawings and the file histories. . . .
>
> After you've decided what the claims mean, you apply the claims as interpreted to the Westview productions [sic, products] in question to determine if the claims read on them."

The jury returned a general verdict finding that there was infringement or two claims and non-infringement of a third. The district court judge then granted the defendant's motion for a directed verdict and set aside the jury's verdict of infringement.

The positions of the parties on appeal in that case reflect the uncertainty of the law today on what is a jury issue and what is not. The patentee-appellant urged that claim construction should be like the law of contracts. It urged:

> "Like contracts, in appropriate circumstances, patent interpretation can be for the court. However, if the court, after resorting to the undisputed recognized sources of claim construction (*e.g.*, specification, other claims), perceives an ambiguity which cannot be resolved from these documents, extrinsic evidence (*e.g.*, expert testimony) is appropriate and, upon such an evidentiary conflict, the jury is required to resolve the factual question. *Singer Mfg. v. Cramer*, 192 U.S. 265, 275 (1904); 4 W.M.E. *Jaeger, Williston on Contracts*, § 601 (3d ed. 1961). Similarly, a factual dispute over the meaning of claim terminology in an industry is for the jury and is an appropriate subject for expert testimony."

(Brief of February 14, 1994, p. 25).

*Westview*, on the other hand, argued that claim construction should be similar to a statutory construction:

"The use of testimony by the inventor or inventor's expert as an aid in claim construction should also be discouraged because, unlike contract cases, both sides of the dispute are not on equal footing. If parole evidence is allowed in a contract case, both parties to the contract are permitted to testify about the meaning of contract terms. However, in a patent case, the patent examiner is not allowed to testify about the government's interpretation of the claim. *See Western Electric Co. v. Piezo Technology, Inc.*, 860 F.2d 428, 431-32, 8 U.S.P.Q.2d 1853, 1856 (Fed. Cir. 1988). No one can directly challenge the inventor's testimony about what was intended by the patent language. If contradictory testimony is offered by the other side, in virtually every case it must be "second-hand" interpretation by a witness who was not a party to the patent grant. To the extent that testimony is allowed, the patentee holds an unfair advantage over the public.

Interpreting claims solely on the basis or the specification and prosecution history promotes the twin goals of consistency and predictability, which gave rise to the creation of this Court. As Congress has said:

> 'The uniformity in the law that will result from the centralization of patent appeals in a single court will be a significant improvement from the standpoint of the industries and businesses that rely on the patent system business planning becomes easier as more stable and predictable patent law is introduced.'

H.R. No. 97-312, 97th Cong., 1st Sess. at 9 (1981).

The documentary record is immutable, unlike testimony, which can be tailored to the current position of the litigant. The documentary record is more susceptible to consistent interpretation by both the trial court and this Court on appeal than testimony, which may vary from case to case. Finally, eliminating witness testimony removes any doubt about whether claim construction can ever be a question of fact for the jury. Allowing juries to decide claim construction often clouds patent law because their claim construction is so

inextricably interwoven with fact findings that it is difficult to review on appeal."

Two other legal issues should be mentioned at the outset. The parties are in disagreement as to who is the hypothetical person of ordinary skill in the art to whom the claims here are directed. This, of course, is the most fundamental of claim construction issues, since, if the dispute is material to the claim construction at issue, without such a determination no determination can be made as to what the claims mean to such a person. It is clear that the jury must decide this question in deciding the allegation by Nintendo that the '555 patent is invalid because the claimed subject matter was obvious to a person of ordinary skill. The issue of who is one of ordinary skill in the art is a question of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The fact-finder must determine the level of skill of the hypothetical person of *ordinary* skill and what that person would have been able to do when in possession of the prior art. *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 454 (Fed. Cir. 1985).[3]

The second issue is what type of extrinsic evidence the court should consider in claim construction as a matter of law. The parties are in agreement that the patent, the file wrapper and expert testimony are appropriate.[4] The Special Master limited evidence at the hearing to these types. However, Nintendo urges that the exclusion of other extrinsic evidence on claim construction was error:

---

[3] The parties have agreed that the person of ordinary skill for the claim construction issue is a person as of the time of the filing of the application on March 12, 1975. The date for the obviousness determination is the invention date, which may be prior to that. The parties apparently do not urge that the difference in dates is here material.

[4] As mentioned later, I do not believe all types of expert testimony are appropriate to this issue of law.

The cases make clear that evidence which bears on the circumstances surrounding the inception of the patent application, including the development work that led to the patent application is routinely considered by courts as relevant evidence on the issue of claim construction. *See, e.g., Tillotson, Ltd. v. Walbro Corp.*, 831 F.2d 1033, 1037 (Fed. Cir. 1987) ("claims must be construed 'in connection with the other parts of the patent instrument and with the circumstances surrounding the inception of the patent application.'" (*quoting Autogiro Co. of America v. United States*, 384 F.2d 391, 397-98 (Ct. Cl. 1967)); *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753, 760 (Fed. Cir. 1984) (same); *Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1576 (Fed. Cir. 1992)(court looked to the defendant inventor's laboratory notebooks as an aid to claim construction); *Fromson v. Advance Offset Plate, Inc.*, 720 F.2d 1565, 1571 (Fed. Cir. 1983) (in construing claims, court looked to extrinsic evidence); *Moeller v. Ionetics, Inc.*, 794 F.2d 653, 657 (Fed. Cir. 1986) (Federal Circuit found that district court abused its discretion by failing, in construing the claims, to consider extrinsic evidence, including testimony as to "how those skilled in the art would interpret the claim"); *General Electric Co. v. United States*, 572 F.2d 745, 757 (Ct. Cl. 1975) ("'claims are best construed in connection with the other parts of the patent instrument and with the other circumstances surrounding the inception of the patent application.'") quote in *Autogiro*, 384 F.2d at 396-97. *Burns, Inc. v. Dale Electronics Incorporated*, 165 U.S.P.Q. (BNA) 296 (D. Neb. 1969) ("an inventor's own appraisal of what he considers to be the nature of the patent is of prime importance and is to be given great weight").

Letter of May 3, 1994 from Nintendo's counsel.

I do not believe that the cases cited in Nintendo's May 3, 1994 letter support the broad proposition advanced by Nintendo. Rather, those cases allowed extrinsic documentary evidence on the issue of claim construction where such evidence showed how one

of ordinary skill in the art would understand the claims. For example, *Minnesota Mining & Mfg.* hold:

> "the lab notebook of Mr. George Buese, a scientist at JJO *and a person skilled in the casting art*, together with related testimony indicate that prior to this litigation JJO reviewed the Garwood specification and compared claim 1 to the JJO products in an attempt to get around the claimed invention. The comparison and calculations made show that JJO understood that the mesh size is measured by multiplying the courses times the wales. Likewise, documents obtained from Mr. Burton Dahlen, a former research manager at Cutter *and another person skilled in the casting art*, together with his testimony establish that Cutter also reviewed the Garwood specification and understood that the number of mesh openings is determined by multiplying the number of courses per inch by the number of wales per inch." *Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d at 1576 F.2d at 1576 (emphasis added).

There in also a possible issue with whether counsels' opinions should be considered in claim construction. The Special Master raised this issue prior to the hearing. Neither party believed it was appropriate to consider these. No evidence of counsels' opinions presented at the hearing. However, after the hearing Alpex has taken the position that certain statements in Nintendo's opinions may be extrinsic evidence and/or admissions depending on the evidence adduced by Nintendo at trial.

Based on the above, my interpretation of the proper standard of claim construction as a matter of law is as follows. The claims are to be construed as a matter of law as they would be understood by one of ordinary skill in the art to which the subject matter of the patent pertains at the time the patent was filed. In making this construction, the Court may refer to publicly available documents relating to the patent, *i.e.*, the patent, the file history and documents to which reference is there made. This is more akin to statutory construction (*e.g.*, referring to legislation

history) than it is to contract construction, although neither is directly analogous.

If the Court does not itself understand the claims' language after this analysis (not being knowledgeable what a person of ordinary skill would understand as to terms of art), then expert testimony may be received to understand what the terms and language in the claims would mean to a person of skill in the art. This expert testimony is limited, however. I believe the correct scope of this testimony is as described in Judge Nowman's dissent in *Advanced Cardiovascular Sys. v. Scimed Life Sys.*, 887 F.2d 1070 (Fed. Cir. 1989) ("purpose of expert testimony is to provide assistance to the court in understanding when the claims ere technologically complex or linguistically obscure, how a technician in the field, reading the patent, would understand the claims," citing *Snellman v. Ricoh Co.*, 862 F.2d 283, 287 (Fed. Cir. 1988)).

In explaining what the terms mean, the experts may refer to other documents and things which reflect what persons of ordinary skill understood at the time. These other documents and things, however, must be shown to be within the knowledge of those of ordinary skill, and should be limited strictly to the purpose of the testimony *i.e.*, to help in understanding what the language means to one of ordinary skill. This means inventors' notebooks, machines and prototypes upon which the inventor was working, licenses, etc. would not be considered because they would not be publicly available and/or because they would not necessarily reflect the knowledge of a person of ordinary skill, the inventor being of possibly higher or lower skill.

If in using this analysis the language of the claims becomes clear, than the Court should construe them. If, however, this analysis still leaves material questions as to terms or meanings in the claims, then the Court should either consider these as questions of fact for the fact finder, or defer construing the claims until such time as the claims become clear, either through the receipt of further evidence of the first type or otherwise (e.g.,

agreements of the parties or other extrinsic evidence about which there is no factual dispute).

## RECOMMENDATION

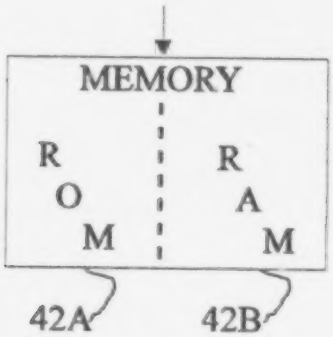
For many reasons, including the current possibly incomplete status of the record and the possibility of supplementing it at trial, the dispute as to whom is a person of ordinary skill with regard to the '555 patent, the issue of what extrinsic evidence may be considered on claim construction and the unsettled status of the law on the functions of the Court and jury on claim construction as reflected by the *Markman* case now on appeal in the Federal Circuit and various other practical considerations, it is not appropriate at this time to construe the claims as a matter of law. The issue of claim construction and what should be decided by the Court and what given to the jury should be addressed later during the trial itself.

However, both parties indicated that they believed claim construction was appropriate as a matter of law based on the evidence adduced at the May 2 hearing. Based on that understanding, subject to supplementing or changing the construction based on a more complete record, or on consideration of additional legal authority, and based only on the record made at the May 2, 1994 hearing, my recommended claim construction for the issues raised at the May 2, 1994 hearing is as follows:

(1) With respect to the elements in Claim 12 (and also to such elements which are incorporated by reference in Claim 13 pursuant to 35 U.S.C. § 112 (¶ 4)) which are expressed as a means for performing a specified function pursuant to 35 U.S.C. § 112 (¶ 6) (hereinafter "the means limitations"), the corresponding structure is not construed to require on-board memory. This construction does not, however, limit in any way the evidence to be adduced pursuant to paragraph 2 below.

(2) The Court construed the corresponding structure for the means limitations in the Court's January 18, 1991 Opinion and Order as including all of the components illustrated in Figure 2

of the patent, other than the keyboard and the television receiver. The parties agree with this construction. Figure 2 of the patent includes the following structure:




There should be no further construction of this structure as a matter of law. The issue of what specific attributes and/or physical elements this construed structure in the specification has are fact issues for the jury. They are not properly claim construction issues as a matter of law.

(3) The following claim construction on page 11 relating to memory in the 1991 Opinion and; Order is withdrawn:

> "The prosecution history of the patent combined with this description of the replaceable memory in the specification suggest that claim 12 does include replaceable memory in the form of modular plug-in units."
>
> * * * *
>
> "While we hold that the claim includes the requirement of modular plug-in units . . ."

This issue will be handled at trial according to ¶ 2 hereof.

(4) The term:

> " . . . a replaceable memory having program game instructions stored therein for controlling said microprocessor means, whereby different games may be played with said apparatus by replacing said replaceable memory."

in Claim 13 is a term of art the meaning of which is disputed and for which extrinsic evidence is needed: to explain the meaning thereof. This term should be left as a factual issue for the jury.

(5) The question of whom is a person skilled in the art to which U.S. Patent No. 4,026,555 pertains is a factual issue for the jury.

The reason, for this recommendation follows, in somewhat different order than as set forth above.

**ISSUE 1. WHO IS A PERSON OF ORDINARY SKILL?**

As noted, the issue of whom is a person of ordinary skill in the art is a fact question. The fact-finder must determine the level of skill of the hypothetical person of *ordinary* skill and what that person would have been able to do when in possession of the prior art. *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 454 (Fed. Cir. 1985).

Nintendo urges that the level of ordinary skill should be one who has:

> "at least a bachelor's degree in electrical engineering and is knowledgeable about television display control systems, is knowledgeable about microprocessors, and about memory associated with microprocessors."

(5/2/94 Tr. pp. 31-32).[5] Nintendo proffered Dr. Steven A. Ward, a Professor at M.I.T., as its technical expert to aid in claim construction.

---

[5] All references herein are to the May 2, 1994 transcript.

Dr. Ward's credentials to testify as to what one skilled in the art relating to the '555 patent would understand was vigorously opposed by Alpex. Alpex contended that one of ordinary skill was one knowledgeable about video games in this general time period. It attacked Dr. Ward's expertise in video games but not in computers.

The Alpex definition of a person of ordinary skill was:

> "Someone who has at least a bachelor's degree in electrical engineering and computer science. The person may have a master's degree in the same area. And he must have at least two or three years of direct hands-on experience in the video game industry, must be familiar with the use of microprocessors and in video game and memory that is used in video games and just have at least two or three years of hands-on experience."

(Tr. 33).

Alpex offered Mr. Milner as such an expert. No objection was made to his qualifications. The Special Master determined both were experts for the purpose of the '555 patent.

The issue of whether this is a "computer" patent or a "games" patent is central to this case. Apparently this issue may affect the status of the pertinent prior art Its resolution may also affect claim construction. *See, e.g.*, the discussion hereafter concerning "replaceable memory." That term may mean one thing to a person of skill in the computer area and something different to one in video games.

Aside from the parties' contradictory positions and conclusory statement by the experts, no direct evidence was proffered at the May 2 hearing on the level of skill, although some of the evidence presented did bear on this issue.

This hotly-contested issue should be left for the trial of this action and cannot be determined as a matter of law at this time.

## ISSUE 2. WHAT IS THE MEMORY STRUCTURE OF THE MEANS - PLUS - FUNCTION LIMITATIONS?

The 1991 Opinion and Order construed each of the means-plus-function limitations of Claim 12 ("first means," "second means," and "means responsive to said manually operable game control means for causing . . ."), as well as those same limitations in Claim 13 which is a dependent claim on Claim 12, to include all of Figure 2 of the patent except for the keyboard and TV Receiver. The hearing concerned the memory component 42 pictured, *supra*, of Figure 2.

There are two discrete issues presented with regard to these means and limitations, as urged by the parties: First, is the structure in each of these means-plus-function limitations limited to on-board memory, as now urged by Nintendo. Second, is the structure of each of these means-plus-function limitations limited to replaceable memory in the form of modular plug-in units, as found in the 1991 Opinion and Order.

**On-Board Memory**

As an initial proposition, the issue of what is proper claim construction when dealing with a means plus function type limitation, is addressed. Here the Court has already construed each of the means-plus-function limitations in Claim 12 in terms of what structure in the patent corresponds thereto. The Court has specifically construed and the parties have agreed, that all of the elements other than the keyboard and the TV receiver as shown in Figure 2 are the corresponding structures referred to in these means-plus-function claims. The question is whether the structure should be further defined or limited by the Court.

This point was not briefed by the parties other than inferentially. The law is that limitations in the specification should not be read into the claims as a letter of claim construction. *Constant v. Advanced Micro-Services, Inc.*, 848 F.2d 1560 (Fed. Cir. 1988). On the other hand, the specification is to be used to pursue the claims. *E.I. duPont de Nemours & Co. v. Phillips*

*Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1987). As with the parsing of the function of the Court and jury in a patent jury trial, the question of what is adding a limitation versus what is construing a claim in view of the specification is one of difficulty.

It seems clear that the Court can and should construe claims under 35 U.S.C. § 112(6) by construing the "corresponding structure" in the specification in the same way it would if that actual structure were set forth in the claims. That is, if it is clear to the Court based upon an understanding of the technical terms what the memory at issue is and how it operates, it should so instruct the jury. On the other hand, if once identifying the memory structure, the evidence is conflicting as to how it operates or what it does, then this is a factual issue for the jury.

Alpex offered testimony of the expert Dr. Ward that the ROM memory 42 necessarily was on-board.

Dr. Ward testified that on-board ROM (also called resident ROM) was what ROM 42A in Figure 2 represents. He stated the on-board or resident ROM must be present in the apparatus described in the patent in order to perform any functions whatsoever. For example, he testified that when power is on to the microprocessor as described in the specification, a set of functions are performed before any game is selected, *e.g.*, the Figure "G" appears initially on the TV screen. These pre-game functions are performed by executing instructions out of the resident or on-board RAM 42A. However, on cross-examination, he admitted that on-board ROM was his own terminology, the term did not appear in the patent and that microprocessor systems at that time could have been built without on-board ROM, although to do so was unusual.

He also testified that his position on "construal" of the claims had changed and evolved since he first studied the patent in 1989. He apparently gave three affidavits in connection with Nintendo's various motions over a period of several years which dealt with claim construction. None of these apparently talked about on-board ROM, according to the examination. The affidavits themselves were not offered at the hearing.

The other expert, Mr. Milner, testified that upon his reading of the patent, he found nothing there which suggested or required resident, on-board ROM. He testified that all of ROM 42A could have been contained in the cartridges rather than be on-board. He believed all the memory was of the ROM modular, plug-in type.

This diametrically opposed understanding of two experts does not the stuff of clear meaning of the patent make.

My conclusion is that no further elaboration on what specific structures support the means limitations should be done at this time. The jury will be permitted to hear all the evidence and decide the specific structure and operation of memory 42. *Medtronic Inc. v. Intermedics, Inc.*, 799 F.2d 734, 742 (Fed. Cir. 1986) ("Other parts in the R/S patent specification which permitted the jury to construe the 'means' limitations of the R/S claims were 'tissue-attaching member,' 'stainless steel attaching point,' and 'barbs.' [citing R/S patent specification) There was, in short, substantial evidence for the jury's findings that Medtronics had not infringed the R/S patent (if it is deemed valid).").

Furthermore, since the record has not been fully developed on who is a person of ordinary skill, I believe it is also premature to decide this issue at this time. Rather, the issue should be addressed at trial, again by either construing the claims on all of the probative evidence as a matter of law, or by submitting the issue to the jury, along with the factual issues.

The practicalities also dictate a later address of this issue. Prior to the submission of this case to the jury, there may be a decision in the *Markman v. Westview* case on appeal which would shed light on what should be submitted to the jury and what should not. Secondly, if there is other extrinsic evidence allowed during trial which would bear on claim construction, it should be considered. Thirdly, if this claim element is now construed, the parties will have to present their cases with this construction in mind. This leads to the possibility that if the claim is wrongly construed now, particularly on the basis of incomplete evidence,

that this will be later argued as a basis of appeal. If accepted, that may require a new trial.

**Replaceable Memory in the Form of Modular Plug-in ROM**

The other side of Nintendo's argument is that the memory structure should not be limited to modular, replaceable ROM. Alpex urges that the construction in the 1991 Opinion and Order is correct.

Dr. Ward testified that the term 'ROM' is used as a collective noun which does not distinguish between ROM implementation that consists entirely of a single chip or a ROM implementation that involves several chips. He testified that it was common practice to make ROM chips so that they could be easily plugged together like Leggo blocks. He saw nothing in the '555 patent which would lead one of ordinary skill to believe that ROM 42A was a single chip. Thus, it could be that the word "games" in the preamble of Claim 12 would not necessarily have to be replaceable memory of the modular plug-in type, because enough memory for the three games described in the patent could be on a series of chips all forming a single ROM 42A.

He also testified that in the mid-1970s ROM was often packaged in plastic or ceramic with pins coming out of each side. Such ROM was often installed in sockets.

He also identified replaceable memory which could be used in the context of a microprocessor-based computer system which included various forms of magnetic storage, ranging from cassette tape, floppy disks, and other types of removable disks, through paper tape and punched cards. These types of non-ROM replaceable memory, he testified, could be used in the structure described in the '555 patent.

He also testified that it would have been the exception, rather than the rule, in 1975 to have only replaceable memory. He pointed out that in the specification for the '555 patent, that there is no reference to replaceable ROM, except for a single paragraph near the end of the patent in column 17.

As stated above, Mr. Milner testified that the '555 patent was limited to replaceable memory of the modular plug-in type. However, on cross-examination, he testified that cartridges containing ROM were not known as of March, 1975.

At this time the claims should not be construed as a matter of law to be limited to replaceable memory in the form of modular plug-in units. The specification related to ROM 42A and the level of skill do not make this an unambiguous requirement. Furthermore, and in addition to all of the reasons set forth above relating to who is a person of ordinary skill, other extrinsic evidence and the practicalities of delaying a decision later in the trial, this ruling would obviate the issue raised by Nintendo at the pre-hearing conferences relating to its experts having to take alternative positions at the trial if the claim construction is left as it now is. It is therefor, recommended that the claim construction in the 1991 Opinion and Order be modified such that the Figure 2 structure is not necessarily limited to replaceable memory in the form of modular plug-in units, *i.e.*, that the term 'replaceable memory in the form of modular plug-in units' should be deleted from the claim construction for claims 12 and 13.

**ISSUE 3. WHAT IS REPLACEABLE MEMORY IN CLAIM 13?**

The issue here is different from the previous claim construction issues. Here, "replaceable memory" are actual words of the claim. That is, they are not written in the means-plus-function language of 35 U.S.C. § 112(6). The claim construction, then, is not what structure is disclosed in the specification which corresponds with this meaning. Rather, it is what these words themselves mean to a person of ordinary skill. *See Fromson: Smith Kline Diagnostics, Inc. v. Helena Laboratories Corp.*, 859 F.2d at 882 ("Moreover, the claims should be construed as one skilled in the art would construe them.")

As summarized above, Dr. Ward and Mr. Milner are in dispute as to what these words mean.

Dr. Ward testified that replaceable memory would include such things as paper tape and magnetic tape. Mr. Milner, on the other hand, stated that in the art "memory" has a specific meaning and it excludes storage media. Such things as paper tape and magnetic tape are storage media, not memory, according to Mr. Milner.

I conclude that "replaceable memory" is an ambiguous term, the meaning of which should be left to the jury, according to the case law. This is for all of the reasons above. Additionally, the term "replaceable memory" may be very context-dependent based upon the factual determination as to whether this is a computer patent or a games patent. The term "replaceable memory" may have a such different meaning within the context of the computer world than it would within the game world. Because this factual predicate has not yet been determined, the term "replaceable memory" cannot be construed as a matter of law.

/s/Thomas L. Creel
Thomas L. Creel
Special Master

Dated: May 7, 1994

## APPENDIX B

**UNITED STATES DISTRICT COURT**
**SOUTHERN DISTRICT OF NEW YORK**

**ALPEX COMPUTER CORPORATION,**
**Plaintiff,**

**-against-**

**NINTENDO COMPANY LIMITED and**
**NINTENDO CORPORATION OF AMERICA,**
**Defendants.**

**86 Civ. 1749 (KMW)**

## SUPPLEMENTAL REPORT OF SPECIAL MASTER ON CLAIM CONSTRUCTION OF CLAIMS 12 & 13 OF UNITED STATES LETTER PATENT NUMBER 4,026,555

This is a supplemental report of Special Master Thomas L. Creel to the report of May 7, 1994. It supersedes all statements or positions made thereafter by the Special Master concerning claim construction.

The May 7th report was the result of an evidentiary hearing on May 2, 1994, before trial, for the purposes of claim construction as a matter of law of claims 12 and 13 of United States Letter Patent Number 4,026,555 ("555 patent"). That report concluded that it was not appropriate at that time to further construe the claims as a matter of law from the construction already done in 1991. That was for several reasons, including that the record was incomplete and that further legal authorities might be provided. The issue of bit-mapping v. on-the-fly was not addressed at that hearing, but is here.

In that report it was stated that the issue of claim construction might be addressed at a later time should the meaning of the claims become clearer. This supplemental report is based upon the evidence adduced at trial and further submission of legal authorities.

This report covers only the first part of the 35 U.S.C. § 112(6) analysis, *i.e.*, what is the corresponding structure in the specification for the means-plus-function elements of claims 12 and 13. It does not address what might be equivalents to such structure. It is not a report under Fed. R. Civ. P. 53(e)(3).

## RECOMMENDATIONS

1. The construction for the jury of the means clauses in claims 12 and 13 for generating a video signal should include not only an identification of the physical structural components corresponding to this function, *i.e.*, Fig. 2 without the video monitor and keyboard, but also how the components of that structure operate or act together to perform the specified function of the means-plus-function elements. My suggested charge is as follows:

> "The structure corresponding to the elements of claims 12 and 13 for generating a video signal is the Figure 2 components without the television receiver and the keyboard. These components cooperate together to create a video signal as follows: The linear player image device and the ball image device to be displayed on the video unit 30 are stored as data within ROM 42A. The "intelligence" of the system is provided by micro-processor 40. The operation of the micro-processor 40 is under the control of a program stored in ROM 42A. Micro-processor 40 causes this information in ROM 42A to be written into RAM 32 by using the write control circuit 38. RAM 32 was discrete storage positions which correspond to each of the bars or pixels of the TV screen. TV interface 36 causes display RAM address 34 to scan each of these storage positions in display RAM 32 to provide the video signal to the TV receiver 30."

2. To the extent Mr. Milner's testimony relating to the claims of the patent is inconsistent with the above, the jury should be instructed to disregard it.

3. There is no file wrapper estoppel based on what was said in the '555 file history about claim 1 and the distinction over the Okuda prior art. There should be no jury instruction directed to this as a possible estoppel.

4. The Court should not alter its construction of the claim language to limit the '555 patent claims to on-board ROM. The jury should be instructed that the claims should be construed to cover the memory of Figure 2, i.e., ROM 42A. Whether ROM 42A is on-board or not is a question of fact for the jury.

5. The jury should be instructed that "linear player image" in claim 12 is different than the term "player image". The jury should determine the factual issue of what the term "linear player image" means.

## DISCUSSION

### A. The Law As To Means-Plus-Function Elements Under 35 U.S.C. § 112(6)

The portions of the claims at issue here are written as claim elements or limitations expressed in means-plus-function terms. This type of claim expression is authorized by 35 U.S.C. § 112(6):

> "An element in a claim for a combination may be expressed as a means or a step for performing a specified function without the recital of structure, material or acts in support thereof and such claims shall be construed to cover the corresponding structure, material or acts described in the specification and equivalents thereof."

The history of § 112(6) is summarized in *Valmont Industries v. Reinke Manufacturing Company*, 983 F.2d 1039 (Fed. Cir. 1993). In 1952, Congress added this paragraph to § 112 of the Patent Act to change the doctrine enunciated in *Halliburton Oil*

*Well Cementing Co. v. Walker*, 329 U.S. 1 (1946). In *Halliburton*, the Supreme Court prohibited the use of means-plus-function language to describe the "most crucial element" of a combination claim. The Court feared that means-plus-function language was overbroad and ambiguous. The Court described such language in the following terms:

> "The language of the claim thus describes this most crucial element in the 'new' combination in terms of what it will do rather than in terms of its own physical characteristics or its arrangement in the new combination apparatus. We have held that a claim with such a description is invalid. . . ." *Halliburton*, at 9.

Thereafter, Congress enacted § 112(6) to permit broad means-plus-function language. *Valmont*, at 1042. However, in so doing, it placed a limitation on what such language would cover so that it did not cover all means for performing the function. Id. The limitation was that the functional claim language only covered the "corresponding structure, material or acts described in the specification and equivalents thereof." *Id.* In other words, § 112(6) permits means-plus-function language, but with a "string attached." *Id.* The "attached string" limits the claimed means, as a matter of literal infringement, to the structure, material, or acts in the patent specification and their equivalents. *Id.*

To be literally infringed, the accused structure must meet every claim element (each element or limitation must "read on" the accused structure). *Pennwalt Corp. v. Durand-Wayland*, 833 F.2d 931 (Fed. Cir. 1987). The doctrine of equivalents is applied if literal infringement is not present, but the accused structure performs substantially the same function in substantially the same way to obtain substantially the same result. *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950). Thus in claim elements written in means-plus-function language, there is a structural equivalents analysis to apply for literal infringement purposes and then a doctrine of equivalents analysis to be made if literal infringement is not found. The analyses are not the same. *See Pennwalt, supra.*

The question of when and how the doctrine of equivalents is to be henceforth applied is now before the Federal Circuit Court of Appeals in *Hilton-Davis Chemical Co. v. Warner-Jenkinson*, Fed. Cir. Dkt. No. 93-1088 argued on March 9, 1994.[1]

### B. Construction Of The Means For Generating A Video Signal Elements In Claims 12 and 13[2]

The first issue of claim construction concerns the means-plus-function limitations in Claim 12 relating to generating a video signal.[3]

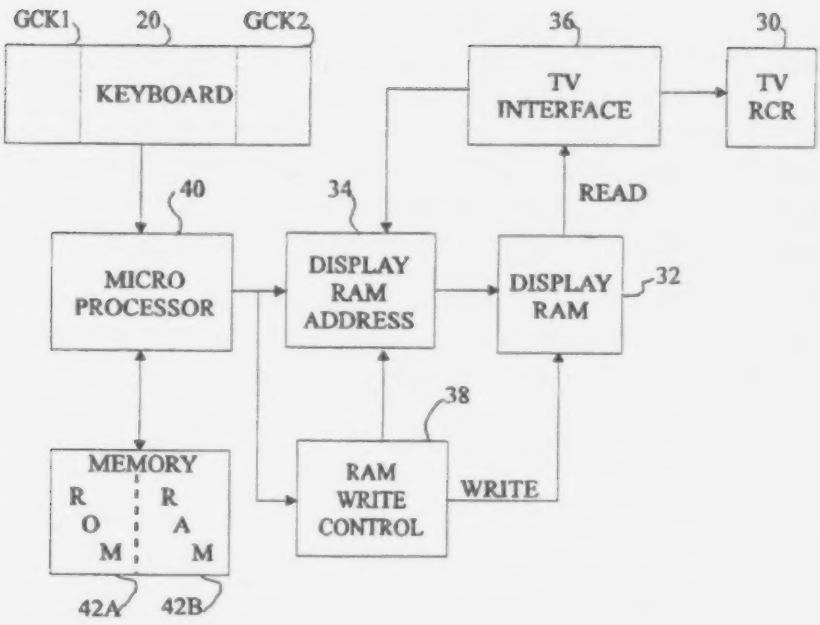
The Court in 1991 and the Special Master's May 7, 1994 report which the Court adopted, construed the structure corresponding to this functional language to be all of the components illustrated in Figure 2 of the patent other than the keyboard and television receiver. Figure 2 of the patent is as follows:

---

[1] On another issue, Alpex has urged that because of the uncertainty of what the Federal Circuit may do with the doctrine of equivalents in the *en banc* argument in *Hilton-Davis*, that that issue should go to the jury so that the Federal Circuit has the benefit of the jury's verdict if the law should be changed. The same reasoning would seem to apply to the pending *en banc* appeal in *Markman & Posetic* relating to the respective roles of the trial judge and the jury with regard to claim construction. Thus, the Court may want to consider deferring acting on this report until after the jury verdict.

[2] This aspect of claim construction was not covered in the May 2, 1994 evidentiary hearing.

[3] For ease of reference, this report will often refer only to the claim elements of claim 12. To the extent these elements are incorporated by reference in dependent claim 13, this report, of course, applies to both claims.




**1. The Parties' contentions on construction of the means for generating a video signal**

Neither party raised any objection to the May 7, 1994 claim construction.

Nintendo urges, however, that the structure corresponding to the video signal generating means as shown in Figure 2 should be further construed for the jury as the interconnected assembly of the depicted building blocks in Figure 2, *i.e.*, that the corresponding structure includes not only that physical hardware but (1) how that hardware is configured within the system and (2) how it functions or operates within that system. Nintendo identifies the Display RAM Address 34, the RAM Write Control 38, the Display RAM 32 and the TV Interface 36 as building blocks which together comprise a "bit map structure" corresponding to the video signal generating means language of this claim element. Thus, Nintendo urges that the "structure" of Display RAM 32, a central issue, is not merely the four Intel 2107 series RAMs which comprise this Display RAM as set forth

column 5 lines 18-21 of the patent or the block representing Display RAM 32 in Figure 2. Rather because of the way these Intel RAMs are configured in this video signal generating means, the *Display RAM* 32 is actually a "bit map structure," *i.e.*, "it was no longer referred to generically as RAM, but became a specific structural component, display RAM 32, which interacts with the other structural components in a specific way *and* only in that way." (Nintendo brief of May 25, 1994, p. 3.)

Nintendo's position might be called the "name defense", *i.e.*, the accused NES system is called an "on-the-fly" system, so it must be different from the system known as a "bit map" system described in the patent and therefore Nintendo does not infringe. *See, e.g.*, Nintendo Exhibits 289 and 290.

Alpex, on the other hand, claims that bit-mapping is a "function" or method of video display rather than a "structure." The structure according to Alpex is Figure 2, as already construed. It urges any further limitations in this structure would be error since that would only be incorporating by reference the preferred embodiment of the patent.[4]

Alpex urges:

> The patent describes Figure 2 as "a general block diagram of the invention" (Col. 2, line 17).[5] Several lines further on, the patent states that: "in the following description, a particular example is presented for purposes of explanation only." (Col. 2, lines 30-31). It is only in this "particular example" that the display RAM is further described as including "a multiplicity

---

[4] Nintendo responds that there is only one embodiment shown in all at all in the patent. Therefore, it states, the "structure, material or acts" must be what's shown in that embodiment regardless of what it is called in the specification.

[5] This is reinforced in Col. 4 at lines 27-29; "FIG 2 is a block diagram showing in general diagrammatic terms the manner in which the invention operates." (Footnote in original quote).

of discrete storage positions which correspond to each of the 'bars' of the TV rasters as defined above." (Col. 5, lines 2-5). This further limitation is not required by the structure disclosed in Figure 2. Reading this limitation into Figure 2 and, through Figure 2 into claims 12 and 13, is improper. (Alpex Submission of Points and Authorities In Response to the Special Master's May 24, 1994 Request, p. 7.)

Alpex also points to other claims e.g., Claims 1-11, which, in means-plus-function limitations, use bit-mapping as the function, e.g., the element of Claim 1 for "means for selectively writing" digital data into selected ones of said storage positions, together with the means element from that claim of "means for sequentially reading" stored data from said storage positions at said predetermined scanning rate.

The Alpex position might be called the "block offense", i.e., blocks representative of the '555 patent look like blocks representative of the Nintendo NES system and therefore there is infringement. *See, e.g.*, Alpex Exhibit 772.

**2. The law as to "structure, material or acts"**

A preliminary issue in resolving this issue is what the terms "structure, material or acts" mean in § 112(6), particularly in computer/micro-processor configurations. Should these terms be limited to the actual hardware "structure" or should they include the manner in which this hardware is interconnected and how it operates?[6] In view of the parties' basic disagreement about how

---

[6] The Special Master's attempts to properly construe these claims as a matter of law, with over 30 years as a patent attorney and teaching patent law for over 10 years, taking into account the parties' widely differing views and legal authorities on proper claim construction, show how difficult it is for United States district judges to apply the directives of the Court of Appeals for the Federal Circuit that the court should first construe the claims as a matter of law and then the jury should ascertain infringement based on that claim construction. It is fair to say that most judges have little background in either patent law or the technology of the patent. As noted in the Special Master's earlier report, many judges

"structure" is to be considered for § 112(6) purposes, the Special Master asked the parties to provide him with "black letter" law concerning the analytical method by which the corresponding structure, material or acts are to be construed as a matter of law and whether how the identified structure operates to perform the recited function is to be considered as part of the "structure".

Unhappily, neither party provided much in the way of guidance concerning any analytical method which has been used by the courts. The legislative history is not illuminating. It merely says this section overrules Halliburton.

Nintendo asserted

> "[T]he only 'black letter law' the Special Master needs to interpret claims 12 and 13 is the statutory mandate of 35 U.S.C. 112(6), which limits claims 12 and 13 to that structure and equivalents. Controlling Federal Circuit precedent concerning the proper interpretation of means-plus-function claim elements is set forth at page 5 of Nintendo's Mem. in Support of its Motion for a Directed Verdict."

Page 5 of Nintendo's brief cited *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987) (en banc), *cert. denied*, 485 U.S. 961 (1988), *Johnston v. IVAC Corp.*, 885 F.2d 1574, 1580 Fed. Cir. 1989), *In re Donaldson Co., Inc.*, 16 F.3d 1189, 1192 (Fed. Cir. 1994) (en banc), *Valmont Industries, Inc. v. Reinke Mfg. Co., Inc.*, 983 F.2d 1039, 1043 (Fed. Cir. 1993) and *Buehler AG v. Ocrim, S.p.A.*, 836 F. Supp. 1305,

---

confronted with this task simply submit both the issue of claim construction and the factual issue of infringement, as well as the legal issue of obviousness, to the jury, as well as the legal issue of obviousness, to the jury. Then these judges consider the appropriateness of claim construction and the other issues on a motion JNOV. The difficulty in applying proper claim construction as a matter of law before submission to the jury, at the very least, shows the wisdom of only construing the claims as a matter of law when the experts agree on what claim language means.

1321 (N.D. Tex. 1993). In a supplemental brief, Nintendo cited *Arrhythmia Research Technology v. Corazonix Corp.*, 958 F.2d 1053, 1060 (Fed. Cir. 1992).

In *Arrhythmia*, the court identified corresponding structure described in the specification, some of the context of how it was used and how such structure related to other elements as follows:

> "The apparatus claims require a means for converting the electrocardiograph signals from the analog form in which they are generated into digital form. This means is described in the specification as a specific electronic device, a conventional analog-to-digital converter. A Minicomputer, *configured* as described in the specification, is the means of calculating composite digital time segments of the ORS waveform. *The product is stored, as stated in the specification, in the form of electrical signals*. The high pass filter means is described in the specification as the microcomputer *configured to perform* the function of reverse time order filtration of the anterior portion of the QRS waveform. The specification and drawings show a disc memory unit *to store* the composite QRS signals, and associated connecting leads to the computer's processing unit. The comparing means is the processing unit *configured to perform* the specified function of root mean square averaging of the anterior portion of the QRS complex, and comparison of the resulting output with a predetermined level *to provide* an indication of the presence of late potentials in the electrocardiograph signal." (Emphasis added).

Thus, Nintendo argues, using the "high pass filter" means of Arrythmia as an example, that the Court should not end its analysis by simply identifying the physical structure described in the specification that performed the claimed function. Rather, Nintendo urges the court to further continue identifying the content of the structure: "The specification and drawing show a disc memory unit to store the composite QRS signals, and associated connecting leads to the computer's processing unit." *See, e.g., Arrythmia*, at 1060.

Alpex, on the other hand, cites no Federal Circuit cases but refers to the Ninth Circuit's decision in *Velo-bind Inc. v. Minnesota Mining & Manufacturing Company*, 647 F.2d 965, 968 (9th Cir.), *cert. denied*, 454 U.S. 1083 (1981). Alpex asserts that the *Velo-bind* case stands for the proposition that § 112(6) requires only that the "means" be construed in light of the "*corresponding* structure, material or acts" in the specifications; it does not require that the claim be further limited to the description in the specifications. In effect, Alpex urges that the Court instruct the jury to read the means clause to cover the block diagram only and exclude from its deliberations any description of how the various components shown in the block diagram act together or how they operate to generate a video signal.

No one cited any case which refused to explain how the identified structure operated, nor which made any statement that an explanation of how the structural component act together is inappropriate.

The Federal Circuit cases certainly do not seem to make any particular distinction between structure as a physical element such as the ROMs and RAMs in Figure 2 and how they cooperate together. Rather, the cases discuss structure in terms of how the structural components are linked together, as well as the way in which they operate or perform. *See, e.g., In re Donaldson Company*, 16 F.3d 1189, 1196 (Fed. Cir. 1994) (Schuler's specification defines the "'means, responsive to pressure increases in chamber . . ., for moving particular matter in a downward direction' language recited in Claim 1 as a flexible wall, diaphragm-like structure . . . thus, causing caked-on dust to break free from the wall of the hopper and fall towards to ogre screw due to gravity");[7] *Valmont Industries, Inc. v. Reinke Mfg. Co., Inc.*, 983 F.2d 1039, 1044 (Fed. Cir. 1993) (court construes claimed "supporting control means" to be described in the specification as "angle encoders and comparator circuits which *adjust* and *maintain* the angular relationship between the main

---

[7] Emphasis added throughout.

arm and the extension arm"); *Intel Corp. v. U.S. Intern. Trade Com'n*, 946 F.2d 821, 840 (Fed. Cir. 1991) (first biasing means covers "a circuit for charging the column line to one level (charged state) and for preventing it from dropping below another level (discharged state) when the column line is coupled to a conductive memory cell"); *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 933 (Fed Cir. 1987) ("The specification describes the details of a 'hard-wired' network consisting of discrete electrical components which perform each step of the claims, *e.g.*, by *comparing* the signals from the weighing device to reference signals and *sending* an appropriate signal at the proper time to discharge the item into the container corresponding to its weight."); *Texas Instruments v. U.S. Intern. Trade Com'n*, 805 F.2d 1558, 1564-1567 (input means: "keyboard operation whereby *pressure* on a key *causes* a conductive layer on the underside of the key *to contact* and *short circuit* conductive strips lying underneath", electronic means: "the specification shows an array of four integrated semiconductor circuits, three integrated semiconductor shift registers, and two registers, *interconnected* by print conductors located in one plane on an insulating surface"; display means: "shown in the specification as a thermal printer with semiconductor heater elements which are *selectively energized* to create dots on a tape in the form of numbers or symbols").

The cases construing means-plus-function limitations in micro-processor-based applications somewhat similar to that of the '555 patent technology specifically seem to consider the interconnection of the components and the manner in which they operate as part of the structure analysis. *See, e.g., Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931 (Fed. Cir. 1987) (en banc), *cert. denied*, 485 U.S. 961 (1988); *Texas Instruments Inc. v. ITC*, 805 F.2d 1558 (Fed. Cir. 1986); *Valmont Industries v. Reinke Manufacturing Co., Inc.*, 983 F.2d 1039 (Fed. Cir. 1983).

Alpex has not supported its position that block diagrams are all the structure that the jury should consider. It specifically has not supported its position that the only "structure" in the patent may

be ignored because it is only the preferred embodiment. It has provided no authority that a block diagram is in fact structure for § 112(6) purposes, despite the patent describing specific structural features corresponding to the specified blocks of the diagrammatic block diagram.

### 3. Application of the law to the '555 specification

It seems clear that both parties' position should be rejected. They are both too simplistic and meant to enhance their litigation positions. The correct procedure would seem to be to do exactly what the Federal Circuit has done in the cases above. Here the experts are in agreement as to how the structure in the patent operates to generate a video signal. For example, the structure of Display RAM 32 in the Figure 2 construction is specifically identified:

> "Referring now to FIG. 2, the television receiver is shown at 30. In accordance with the invention, a random access memory (hereinafter referred to as a RAM 32 includes a multiplicity of discrete storage positions which correspond to each of the 'bars' of the TV rasters as defined above. Thus, if the number of bars in a raster is 34,650 there will also be at least 34,650 discrete storage positions in the display RAM 32." ('555 Patent, Col. 5, 1. 1-8)

Thus, what was done in those cases should be done here - that is to not only identify the structure in the specification which corresponds to the function of the claim element, but to also explain to the jury how those components operate together to perform the function at issue. This will enable the jurors to understand the structure and thus enhance their fact finding ability as to whether the accused structure is the same or structurally equivalent. It will also assist the jury in making the function/way/result analysis of the doctrine of equivalents.

This construction would seem to comply with the *Halliburton* - § 112(6) dichotomy. *Halliburton* said more detail was necessary in claims, not less. Unless the claim is construed to as to how the structure operates, it is subject to just the vagueness which

concerned the *Halliburton* court. It is hard to see which, if any, of the possible ways to generate a video signal in a microprocessor-based system would be excluded from the Alpex analysis. On the other hand, to adopt the request of Nintendo to give the structure and its operation the name of a bit map structure light divert the analysis from the structural one of the statute. Then the analysis might focus on the names by which various systems have been called over the years.

**C. Mr. Milner's Claim Construction Testimony**

Mr. Milner, Alpex's expert, testified that claim 12 could not be construed as set forth in this Supplemental Report because claim 1 is limited to a bit map apparatus and that, therefore, claim 12 must be broader.

Even assuming *arguendo*, that Mr. Milner is correct, which is open to serious doubt, that cannot affect the claims' statutory meaning. The case of *Laitram v. Rexnord*, 939 F.2d 1533, 1538 (Fed. Cir. 1991) stands for the proposition that regardless of the doctrinal guide of claim differentiation, the language of a means-plus-function element must apply to the corresponding structure in the specification.

> Simply stated, the judicially developed guide to claim interpretation known as "claim differentiation" cannot override the statute. A means-plus function limitation is not made open-ended by the presence of another claim specifically claiming the disclosed structure which underlies the means clause or an equivalent of that structure. If Laitram's argument were adopted, it would provide a convenient way of avoiding the express mandate of section 112(6). We hold that one cannot escape that mandate by merely adding a claim or claims specifically reciting such structure or structures.

Here there is no dispute what the video generation means structure is, nor how it operates.[8]

**D. There Is No File Wrapper Estoppel**

The Nintendo argument is:

> Claim 1, as originally filed, included, inter alia, a "memory means having a multiplicity of discrete digital storage positions, each of said storage position corresponding to a preselected image area of said display tube." The Examiner rejected this claim as anticipated by Okuda. Paper No. 2, dated January 20, 1976, Ward Decl., Ex. D. In response to this rejection, Alpex amended original Claim 1 substituting the term "random access memory" for "memory means." April 12, 1976 Amendment at 2. Alpex also argued that its invention was an improvement over Okuda because Okuda's shift registers were incapable of modifying a single pixel on the television screen. *Id.* at 5-6. Despite the amendment, the Examiner rejected Claim 1 as obvious. Paper No. 4 dated July 21, 1976, Ward Decl., Ex. D. In response, Alpex canceled original Claim 1. September 29, 1976 Amendment, Ward Decl., Ex. D. Although this claim has not been asserted against Nintendo, arguments made by Alpex to distinguish Okuda from the bit-mapped structure described in this claim apply equally to asserted claims 12 and 13, the corresponding structure of which includes the bit-mapped system, including

---

[8] At page 16 of Nintendo's Memorandum in Support of its Motion for a Directed Verdict it indicates that the Special Master believes the issue of claim differentiation is an issue for the jury. That is not the Special Master's view. Claim differentiation is a doctrine of claim construction, and thus strictly is part of the question of law to be decided by the court. However, when an expert construes terms of art in a claim, he may refer to other claims in so doing if it aids in his understanding of the term of art in question. Also, courts have in the past given the issue of claim construction to the jury, even though it is a question of law. When this is done, the issue of claim differentiation necessarily goes to the jury also.

> the Display RAM, disclosed in Figure 2 of the patent. *The patent examiner did not apply the Okuda reference to the asserted claims because at that time, the Patent Office refused during the examination process to interpret means plus function claims as limited to the corresponding structure disclosed in the patent specification and equivalents thereof.* This past February, the Federal Circuit, in an en banc decision, ejected the position of the Patent Office and held that the statutory mandate of 35 U.S.C. § 112(6) "applies regardless of the context in which the interpretation of means-plus-function language arises, *e.g.*, whether a part of a patentability determination in the PTO or as part of a validity or infringement determination in a court." *In re Donaldson Co., Inc.*, 16 F.3d at 1193. Memorandum in Support of Nintendo's Motion for a Directed Verdict, p. 20, emphasis added.

This position is incompetent as a matter of law for claim construction purposes.

The fact that the examiner rejected claims 1 in this manner cannot be an estoppel. The language of claims 1 and 12 is different with regard to video generation. Since the language of claims 1 and 12 is quite different and *Okuda* was never cited against claim 12, there can be no estoppel. The examiner could have allowed claim 12 for any number of reasons unassociated with the *Okuda* agreement, which concerned different language in a different claim.

The *Donaldson* case is irrelevant to this analysis. *Donaldson* merely held that the Patent Office should give the same narrow scope to means-plus-function elements as required by 35 U.S.C. § 112(6) that courts do. If Okuda was relevant prior art to claims 12 and 13, it was as relevant before *Donaldson* as after. *Donaldson* had nothing to do with the prior art status of Okuda with respect to claim 12. For example, claim 12 is a claim directed to an apparatus for playing games, not a video display apparatus as in claim 1. As Nintendo's expert witness, Dr. Ward, admitted on cross-examination, Okuda does not mention

video games, player images, ball images or rotation of such images, all of which are present in Claim 12.

**E. On-Board ROM Is A Fact Issue For The Jury**

As at the May 2, 1994 hearing, Dr. Ward and Mr. Milner, both of whom were qualified as experts, disagreed as to the teachings of the '555 patent with regard to on-board ROM(also known as resident ROM). They have done the same at trial. This creates an issue of fact for the jury, as explained in the May 7, 1994 Report, in the absence of disregarding of Mr. Milner's testimony as Nintendo has urged should be done in its Motion for a Directed Verdict. Whether Mr. Milner's testimony should be disregarded is a trial issue for the Court, not a claim construction issue for the Special Master.

**F. Linear Player Image Definition**

The term linear player image should be construed as a matter of law so as to be different from the term player image. The term player image arises in claim 14.

The experts are in disagreement as to the meaning of linear player image. The meaning of the term is a question of fact for the jury.

Dated: June 1, 1994

/s/Thomas L. Creel

**UNITED STATES COURT OF APPEALS,
FOR THE FEDERAL CIRCUIT**

**ALPEX COMPUTER CORPORATION,**
**Plaintiff/Cross-Appellant,**

**v.**

**NINTENDO COMPANY LTD. and
Nintendo of America, Inc.,**
**Defendants-Appellants.**

**Nos. 95-1191, 95-1229.**

**ORDER**

A combined petition for rehearing and suggestion for rehearing in banc having been filed by the CROSS-APPELLANT, and a response thereto having been invited by the court and filed by the APPELLANT, and the petition for rehearing having been referred to the panel that heard the appeal, and thereafter the suggestion for rehearing in banc, response and CROSS-APPELLANT'S reply to the response having been referred to the circuit judges who are in regular active service,

UPON CONSIDERATION THEREOF, it is

ORDERED that the petition for rehearing be, and the same hereby is, DENIED and it is further

ORDERED that the suggestion for rehearing in banc be, and the same hereby is, DECLINED.

The mandate of the court will issue on January 22, 1997.

For the Court
Jan Horbaly, Clerk

Dated: January 15, 1997

By /s/ Brian P. LeDuc
Brian P. LeDuc
Associate Chief Deputy
Clerk